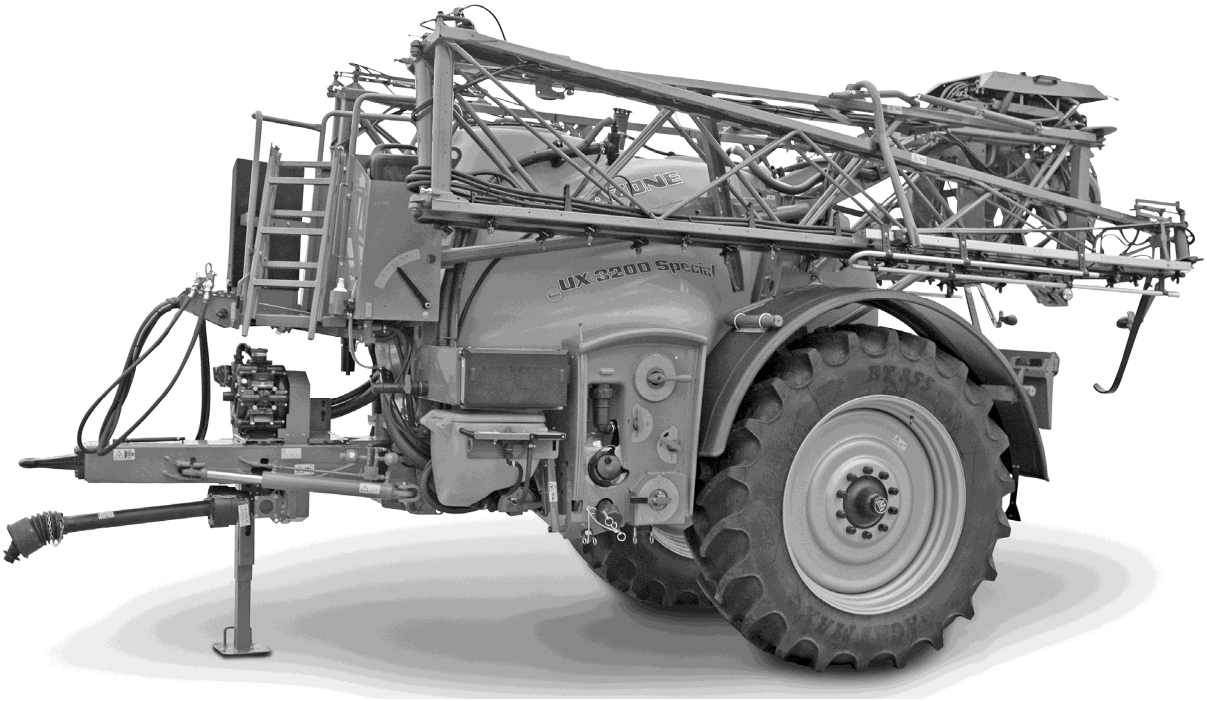
Operating Manual

AMAZONE

UG 2200 Super
UG 3000 Super

UG 2200 Special
UG 3000 Special

Trailed Field Sprayer



MG3506
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Please read this operating manual before commissioning. Keep it in a safe place for future use.

en

Reading the instruction

Manual and following it should seem to be inconvenient and superfluous as it is not enough to hear from others and to realize that a machine is good, to buy it and to believe that now everything should work by itself. The person in question would not only harm himself but also make the mistake of blaming the machine for possible failures instead of himself. In order to ensure success one should enter the mind of a thing, make himself familiar with every part of the machine and get acquainted with how it's handled. Only in this way could you be satisfied both with the machine and with yourself. This goal is the purpose of this instruction manual.

Leipzig-Plagwitz 1872. Rud. Sack.

Identification data

Manufacturer: AMAZONEN-WERKE
H. DREYER GmbH & Co. KG

Machine ID no.: ______________________

Type: ______________________

Permissible system pressure (bar) Maximum 10 bar

Year of manufacture: ______________________

Factory: ______________________

Basic weight (kg): ______________________

Permissible total weight (kg): ______________________

Maximum load (kg): ______________________

Manufacturer's address

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Spare part orders

Spare parts lists are freely accessible in the spare parts portal at www.amazone.de.

Please send orders to your AMAZONE dealer.

Formalities of the operating manual

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Foreword

Dear Customer,

You have chosen one of the quality products from the wide product range of AMAZONEN-WERKE, H. DREYER GmbH & Co. KG. We thank you for your confidence in our products.

On receiving the machine, check to see if it has been damaged during transport or if parts are missing. Using the delivery note, check that the machine has been delivered in full, including any special equipment ordered. Damage can only be rectified if problems are signalled immediately.

Before commissioning, read and understand this operating manual, and particularly the safety information. Only after careful reading will you be able to benefit from the full scope of your newly purchased machine.

Please ensure that all the machine operators have read this operating manual before the machine is commissioned.

Should you have any questions or problems, please consult this operating manual or contact your local service partner.

Regular maintenance and timely replacement of worn or damaged parts increases the lifespan of your machine.

User evaluation

Dear Reader,

We update our operating manuals regularly. Your suggestions for improvement help us to create ever more user-friendly manuals.

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1 User Information

The User Information section provides information on use of the operating manual.

1.1 Purpose of the document

This operating manual

- describes the operation and maintenance of the machine.
- provides important information on safe and efficient handling of the machine.
- is a component part of the machine and should always be kept with the machine or the towing vehicle.
- Keep it in a safe place for future use.

1.2 Locations in the operating manual

All the directions specified in the operating manual are always seen in the direction of travel.

1.3 Diagrams

Instructions and responses

Activities to be carried out by the user are given as numbered instructions. Always keep to the order of the instructions. The response to an instruction is given by an arrow.

Example:

1. Instruction 1

→ Machine response to instruction 1

2. Instruction 2

Lists

Lists without an essential order are shown as a list with bullets.

Example:

- Point 1
- Point 2

Item numbers in diagrams

Numbers in round brackets refer to items in diagrams. The first number refers to the diagram and the second number to the item.

Example: (Fig. 3/6)

- Figure 3
- Item 6

2 General safety instructions

This section contains important information on safe operation of the machine.

2.1 Obligations and liability

Comply with the instructions in the operating manual

Knowledge of the basic safety information and safety regulations is a basic requirement for safe handling and fault-free machine operation.

Obligations of the operator

The operator is obliged only to let those people work with/on the machine who

- are aware of the basic workplace safety information and accident prevention regulations.
- have been instructed in working with/on the machine.
- have read and understood this operating manual.

The operator is obliged

- to keep all the warning symbols on the machine in a legible state.
- to replace damaged warning symbols.

Obligations of the user

Before starting work, anyone charged with working with/on the machine is obliged

- to comply with the basic workplace safety instructions and accident prevention regulations.
- to read and follow the "General safety information" section of this operating manual.
- to read the section "Warning symbols and other labels on the machine" (page 18) of this operating manual and to follow the safety instructions represented by the warning symbols when operating the machine.
- If you still have queries, please contact the manufacturer.

Risks in handling the machine

The machine has been constructed to the state-of-the art and the recognised rules of safety. However, operating the machine may cause risks and restrictions to

- the health and safety of the user or third parties,
- the machine,
- other property.

Only use the machine

- for the purpose for which it was intended.
- in a perfect state of repair.

Eliminate any faults immediately which could impair safety.

Guarantee and liability

Our "General conditions of sales and delivery" are always applicable. These shall be available to the operator, at the latest on conclusion of the contract. Guarantee and liability claims for damage to people or property will be excluded if they can be traced back to one or more of the following causes:

- Improper use of the machine.
- Improper installation, commissioning, operation and maintenance of the machine.
- Operation of the machine with defective safety equipment or improperly attached or non-functioning safety equipment.
- Non-compliance with the instructions in the operating manual regarding commissioning, operation and maintenance.
- Unauthorised design changes to the machine.
- Insufficient monitoring of machine parts which are subject to wear.
- Improperly executed repairs.
- Disasters through the impact of foreign bodies and Acts of God.

2.2 Representation of safety symbols

Safety instructions are indicated by the triangular safety symbol and the highlighted signal word. The signal word (DANGER, WARNING, CAUTION) describes the gravity of the risk and has the following significance:

DANGER

Indicates an immediate high risk which will result in death or serious physical injury (loss of body parts or long term damage) if not avoided.

If the instructions are not followed, then this will result in immediate death or serious physical injury.

WARNING

Indicates a medium risk, which could result in death or (serious) physical injury if not avoided.

If the instructions are not followed, then this may result in death or serious physical injury.

CAUTION

Indicates a low risk which could cause minor or medium level physical injury or damage to property if not avoided.

IMPORTANT

Indicates an obligation to special behaviour or an activity required for proper machine handling.

Non-compliance with these instructions can cause faults on the machine or disturbance to the environment.

NOTE

Indicates handling tips and particularly useful information.

These instructions will help you to use all the functions of your machine in the best way possible.

2.3 Organisational measures

The operator must provide the necessary personal protective equipment as per the information provided by the manufacturer of the crop protection agent to be used, such as:

- Chemical-resistant gloves,
- Chemical-resistant overalls,
- Water-resistant footwear,
- A face mask,
- Breathing protection,
- Safety glasses;
- Skin protection agents, etc.

The operating manual

- must always be kept at the place at which the machine is operated.
- must always be easily accessible for the user and maintenance personnel.

Check all safety equipment regularly.

2.4 Safety and protection equipment

Before starting up the machine each time, all the safety and protection equipment must be properly attached and fully functional. Check all safety and protection equipment regularly.

Faulty safety equipment

Faulty or disassembled safety and protection equipment can lead to dangerous situations.

2.5 Informal safety measures

As well as all the safety information in this operating manual, comply with the general, national regulations pertaining to accident prevention and environmental protection.

When driving on public roads and routes you should comply with the statutory road traffic regulations.

2.6 User training

Only those people who have been trained and instructed may work with/on the machine. The operator must clearly specify the responsibilities of the people charged with operation, maintenance and repair work.

People being trained may only work with/on the machine under the supervision of an experienced person.

Person Activity	**Person specially trained for the activity** [1]	**Trained person** [2]	**Person with specialist training (specialist workshop)** [3]
Loading/Transport	X	X	X
Commissioning	--	X	--
Set-up, tool installation	--	--	X
Operation	--	X	--
Maintenance	--	--	X
Troubleshooting and fault elimination	--	X	X
Disposal	X	--	--

Legend: X..permitted **--**..not permitted

[1] A person who can assume a specific task and who can carry out this task for an appropriately qualified company.

[2] Instructed persons are those who have been instructed in their assigned tasks and in the possible risks in the case of improper behaviour, have been trained if necessary, and have been informed about the necessary protective equipment and measures.

[3] People with specialist technical training shall be considered as a specialist. Due to their specialist training and their knowledge of the appropriate regulations, they can evaluate the work with which they have been charged and detect possible dangers.

Comment:

A qualification equivalent to specialist training can be obtained from several years' experience in the relevant field.

If maintenance and repair work on the machine is additionally marked "Workshop work", only a specialist workshop may carry out such work. The personnel of a specialist workshop shall possess the appropriate knowledge and suitable aids (tools, lifting and support equipment) for carrying out the maintenance and repair work on the machine in a way which is both appropriate and safe.

2.7 Safety measures in normal operation

Only operate the machine if all the safety and protection equipment is fully functional.

Check the machine at least once a day for visible damage and check the function of the safety and protection equipment.

2.8 Danger from residual energy

Note that there may be residual mechanical, hydraulic, pneumatic and electrical/electronic energy on the machine.

Use appropriate measures to inform the operating personnel. You can find detailed information in the relevant sections of this operating manual.

2.9 Maintenance and repair work, fault elimination

Carry out prescribed setting, maintenance and inspection work in good time.

Secure all media such as compressed air and the hydraulic system against unintentional start-up.

Carefully fix and secure larger assemblies to lifting gear when carrying out replacement work.

Regularly check that bolted connections are firmly secured and tighten if necessary.

When the maintenance work is completed, check the function of the safety devices.

2.10 Design changes

You may make no changes, expansions or modifications to the machine without the authorisation of AMAZONEN-WERKE. This also applies when welding support parts.

Any expansion or modification work shall require the written approval of AMAZONEN-WERKE. Only use modification and accessory parts approved by AMAZONEN-WERKE so that the type approval, for example, remains valid in accordance with national and international regulations.

Vehicles with an official type approval or with equipment connected to a vehicle with a valid type approval or approval for road transport according to the German road traffic regulations must be in the state specified by the approval.

WARNING

Risk of crushing, cutting, being trapped or drawn in, or impact through the failure of support parts.

It is strictly forbidden to

- drill holes in the frame or on the running gear.
- increase the size of existing holes on the frame or the running gear.
- weld support parts.

2.10.1 Spare and wear parts and aids

Immediately replace any machine parts which are not in a perfect state.

Only use genuine AMAZONE spare and wear parts, or those approved by AMAZONEN-WERKE, so that the type approval remains valid according to the national and international regulations. The use of spare and wear parts from third parties does not guarantee that they have been constructed in a way as to meet the requirements placed on them.

AMAZONEN-WERKE shall accept no liability for damage caused by the use of non-approved spare and wear parts or aids.

2.11 Cleaning and disposal

Handle and dispose of any materials used carefully, in particular

- when carrying out work on lubrication systems and equipment and
- when cleaning using solvents.

2.12 User workstation

The machine may only be operated by one person sitting in the driver's seat of the tractor.

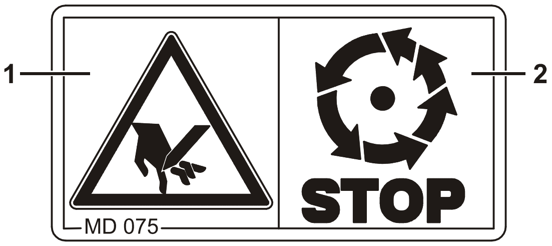
2.13 Warning symbols and other signs on the machine

❗ Always keep all the warning symbols on the machine clean and in a legible state. Replace illegible warning symbols. You can obtain the warning symbols from your dealer using the order number (e.g. MD 078).

Warning symbols - structure

Warning pictograms indicate dangers on the machine and warn against residual dangers. At these points, there are permanent or unexpected dangers.

A warning symbol consists of two fields:



Field 1

is a symbol describing the danger, surrounded by triangular safety symbol.

Field 2

is a symbol showing how to avoid the danger.

Warning symbols - explanation

The column **Order number and explanation** provides an explanation of the neighbouring warning symbol. The description of the warning symbols is always the same and specifies, in the following order:

1. A description of the danger.

   For example: risk of cutting
2. The consequence of non-compliance with the risk avoidance instructions.

   For example: causes serious injuries to fingers or hands.
3. Risk avoidance instructions.

   For example: only touch machine parts when they have come to a complete standstill.

2.13.1 Positions of warning symbols and other labels

Warning symbols

The following diagrams show the arrangement of the warning symbols on the machine.

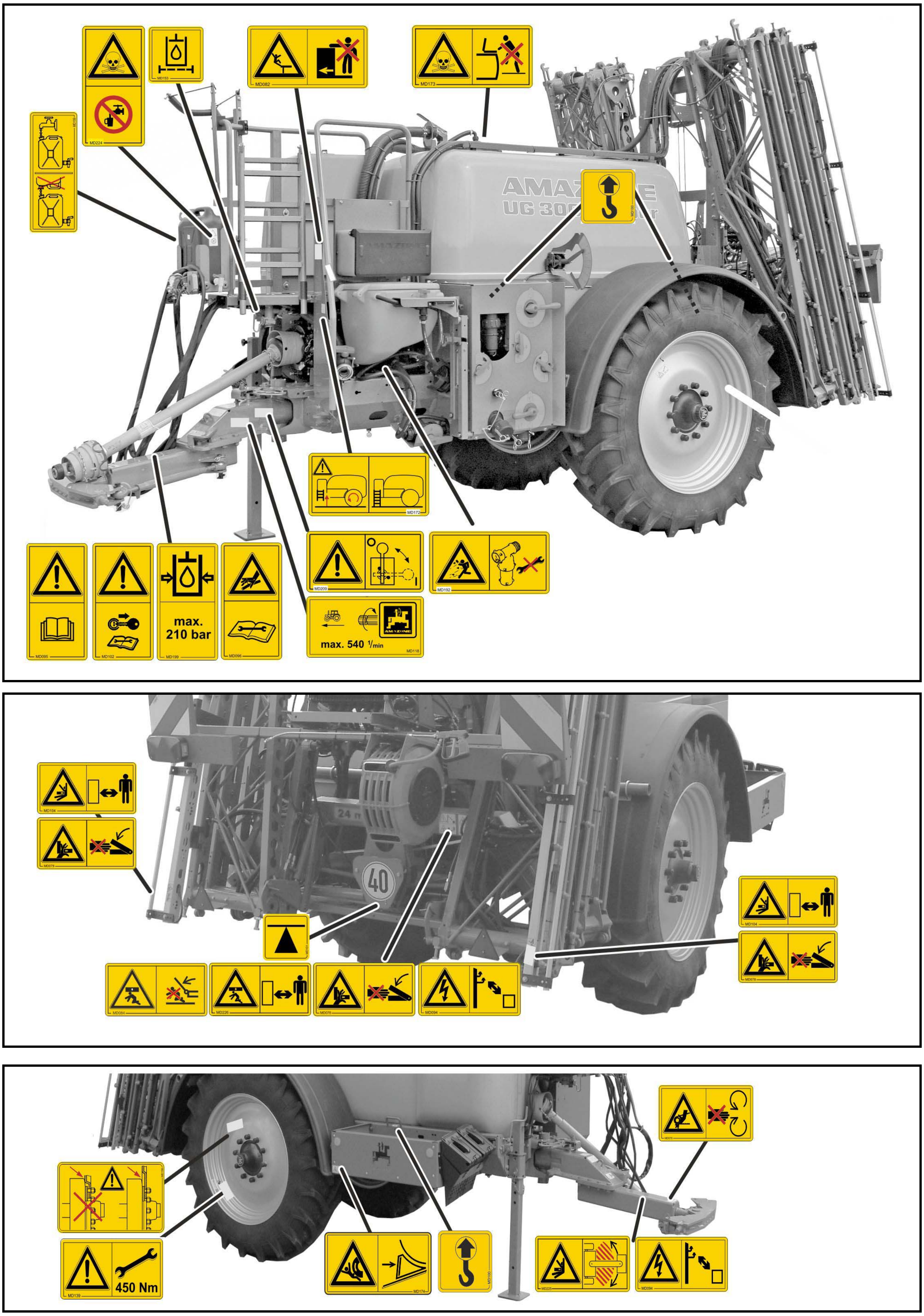

max.
210 bar
max. 540 1/min
40
450 Nm

Fig. 1

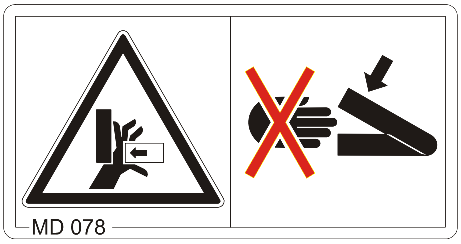
Order number and explanation **Warning symbols**

MD 078

Risk of crushing fingers or hands by accessible moving machine parts.

This danger causes serious injuries, including loss of body parts such as fingers or hand.

Never reach into the danger area while the tractor engine is running and the PTO shaft / hydraulic system is connected.



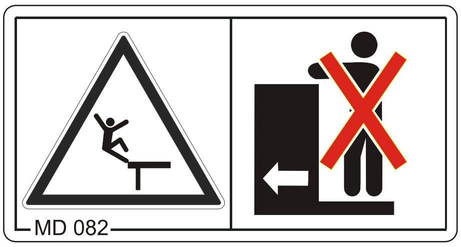
MD 082

Danger of falling from treads and platforms when riding on the machine.

This danger causes serious or potentially fatal injuries anywhere on the body.

It is forbidden to ride on the machine and/or climb the machine while it is running. This also applies to machines with treads or platforms.

Make sure that nobody is riding on the machine.

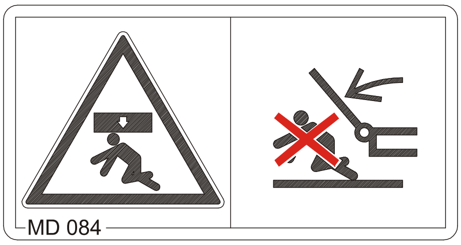


MD 084

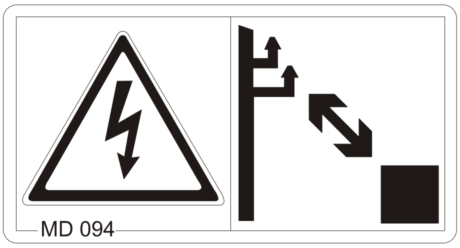
Risk of crushing the entire body due to standing in the swivel range when machine parts are being lowered.

This danger can cause extremely serious and potentially fatal injuries.

- It is forbidden to stand in the swivel range of the machine when machine parts are being lowered.
- Instruct personnel to leave the swivel range of any machine parts which can be lowered before you lower the parts.



MD 094



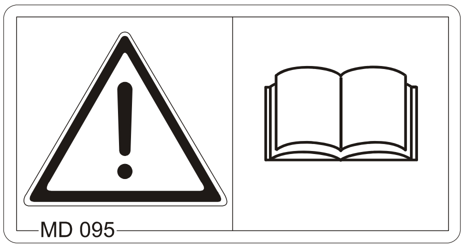
Danger from electric shock or burns due to unintentional contact with electric transmission lines or from approaching high-voltage transmission lines without authorisation.

These dangers can cause extremely serious and potentially fatal injuries.

Maintain an adequate safety distance from transmission lines carrying high voltage.

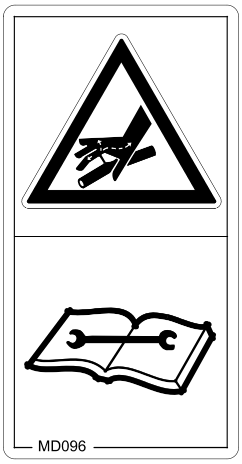
Nominal voltage	Safety distance from transmission lines
up to 1 kV	1 m
over 1 up to 110 kV	2 m
over 110 up to 220 kV	3 m
over 220 up to 380 kV	4 m

MD 095



Read and follow the operating manual and safety information before starting up the machine!

MD 096

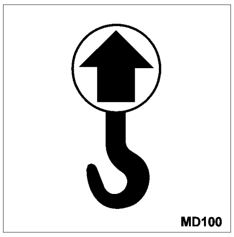


Danger from escaping high-pressure hydraulic fluid due to leaking hydraulic hose lines.

This danger may cause serious injuries, perhaps even resulting in death, if escaping high-pressure hydraulic fluid passes through the skin and into the body.

- Never attempt to plug leaks in hydraulic hose lines with your hand or fingers.
- Read and observe the information in the operating manual before carrying out maintenance work on the hydraulic hose lines.
- If you are injured by hydraulic fluid, contact a doctor immediately.

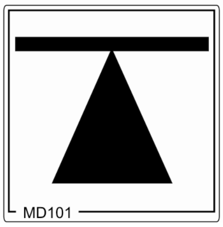
MD 100



This symbol indicates anchorage points for fastening slinging gear when loading the machine.

MD101

This symbol indicates jacking points for lifting gear (jack).

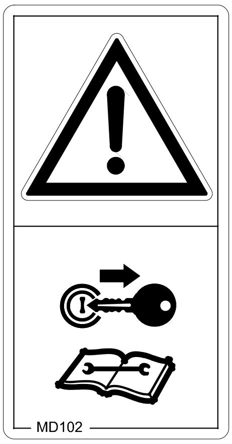


MD 102

Danger from intervention in the machine, e.g. installation, adjusting, troubleshooting, cleaning, maintaining and repairing, due to the tractor and the machine being started unintentionally and rolling.

These dangers can cause extremely serious and potentially fatal injuries.

- Secure the tractor and the machine against unintentional start-up and rolling before any intervention in the machine.
- Depending on the type of intervention, read and observe the instructions in the appropriate sections of the operating manual.

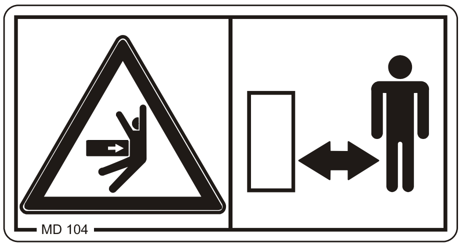


MD 104

Risk of crushing the entire body or impacts due to standing in the swivel range of laterally moving machine parts.

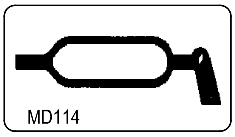
These dangers can cause extremely serious and potentially fatal injuries.

- Maintain an adequate safety distance from moving machine parts while the tractor engine is running.
- Please ensure that all personnel maintain a sufficient safety distance from moving machine parts.



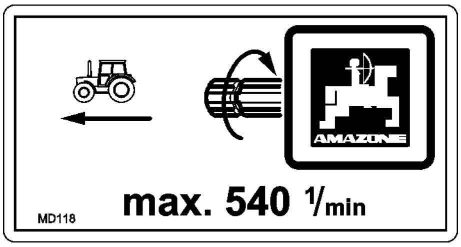
MD 114

This symbol indicates a lubrication point.



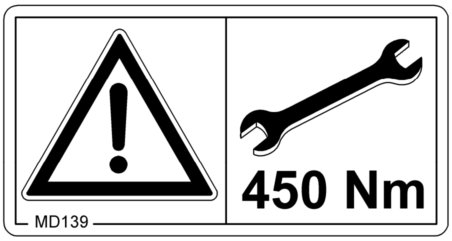
MD 118

This symbol indicates the maximum drive speed (540 rpm) and direction of rotation of the drive shaft on the machine side.



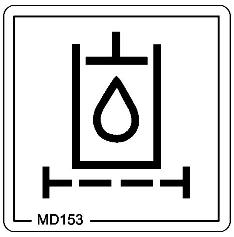
MD 139

The torque of the screw connection is 450 Nm.



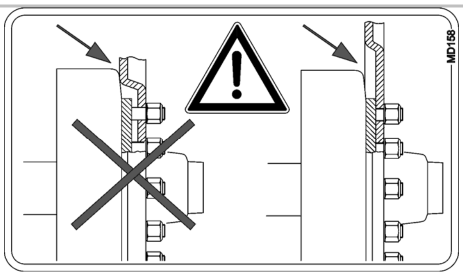
MD 153

This pictogram indicates a hydraulic oil filter.



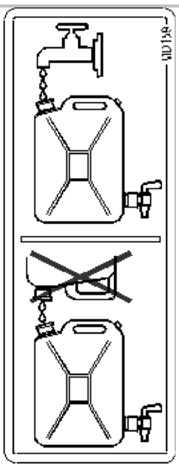
MD158

When using wheels that are not factory assembled, ensure that the rim only touches the wheel hub and not the brake drum!



MD 159

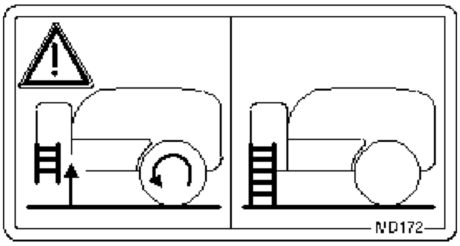
Only fill the hand wash tank with clear fresh water, and never with crop protection agent.



MD 172

-

It is essential to ensure that the ladder is locked in the transport position.

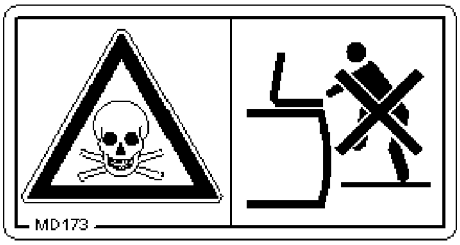


MD 173

Risk of breathing in hazardous materials via poisonous vapours from the spray liquid tank.

This danger can cause extremely serious and potentially fatal injuries.

Never climb into the spray liquid tank.

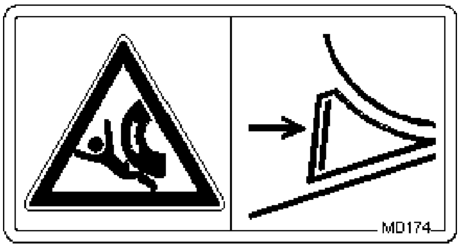


MD 174

Danger from unintended continued movement of the machine.

Causes serious, potentially fatal injuries anywhere on the body.

Secure the machine against unintended continued movement before uncoupling the machine from the tractor. To do this, use the parking brake and/or the wheel chock(s).

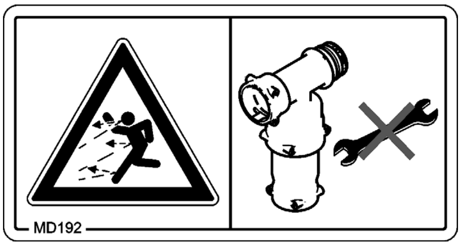


MD 192

Danger of fluids escaping under high pressure while working on hoses and connections under pressure!

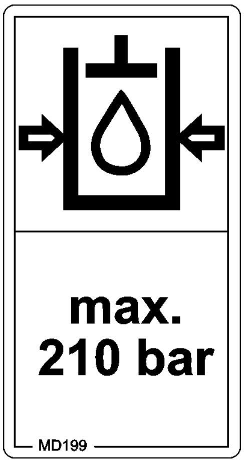
This can result in extremely serious injuries on all parts of the body.

It is not allowed to work on this component.



MD 199

The maximum operating pressure of the hydraulic system is 210 bar!

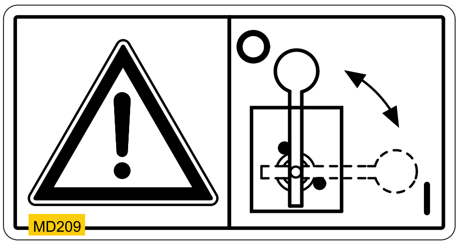


MD 209

Danger during transportation from unintended swivelling of the implement or from moving parts of the implement.

This hazard can result in extremely serious and potentially fatal injuries.

Close the stop tap for transporting.

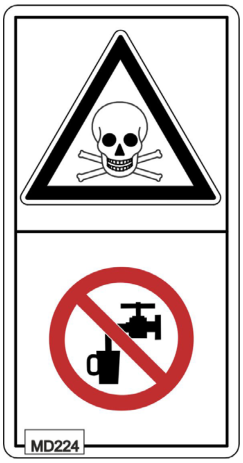


MD 224

Risk of contact with hazardous materials due to improper use of clear fresh water from the hand wash tank.

This danger can cause extremely serious and potentially fatal injuries.

Never use the clear fresh water from the hand wash tank as drinking water.

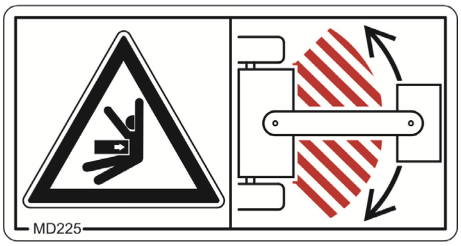


MD 225

Danger of crushing the entire body, caused by remaining in the swivel range of the drawbar between tractor and attached machine.

This danger can cause extremely serious and potentially fatal injuries.

- Do not remain in the danger area between tractor and machine while the tractor engine is running and the tractor is not secured against unintentional rolling.
- Instruct anyone in the danger area between tractor and machine to leave the danger area while the tractor engine is running and the tractor is not secured against unintentional rolling.

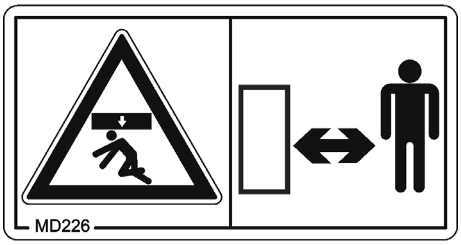


MD 226

Risk of crushing the entire body due to standing under suspended loads or raised machine parts.

This danger can cause extremely serious and potentially fatal injuries.

- It is forbidden to stand under suspended loads or raised machine parts.
- Maintain an adequate safety distance from any suspended loads or raised machine parts.
- Ensure that all personnel maintain an adequate safety distance from suspended loads or raised machine parts.



2.14 Potential risks from not observing the safety instructions

Non-compliance with the safety information

- can pose both a danger to people and also to the environment and machine.
- can lead to the loss of all warranty claims.

In particular, non-compliance with the safety information could pose the following risks:

- Danger to people through non-secured working areas.
- Failure of important machine functions.
- Failure of prescribed methods of maintenance and repair.
- Danger to people through mechanical and chemical influences.
- Risk to the environment through leakage of hydraulic fluid.

2.15 Safety-conscious working

Besides the safety information in this operating manual, the generally applicable national workplace safety and accident prevention regulations are binding.

Comply with the accident prevention instructions on the warning symbols.

When driving on public roads and routes, comply with the appropriate statutory road traffic regulations.

2.16 Safety information for users

WARNING

Risk of crushing, cutting, being trapped or drawn in, or impact through inadequate roadworthiness and operational safety.

Before starting up the machine and the tractor, always check their roadworthiness and operational safety.

2.16.1 General safety and accident prevention information

- Beside these instructions, comply with the generally applicable national safety and accident prevention regulations.
- The warning symbols and other labels attached to the machine provide important information on safe machine operation. Compliance with this information is in the interests of your safety.
- Before moving off and starting up the machine, check the immediate area of the machine (children). Ensure that you can see clearly.
- It is forbidden to ride on the machine or use it as a means of transport.
- Drive in such a way that you always have full control over the tractor with the attached machine.

  In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected machine.

Coupling and uncoupling the machine

- Only connect and transport the machine with tractors suitable for the task.
- When coupling machines to the tractor's three-point linkage, the linkages of the tractor and the machine must always be the same.
- Connect the machine to the prescribed equipment in accordance with the specifications.
- When coupling machines to the front or the rear of the tractor, the following may not be exceeded:
  - The approved total tractor weight
  - The approved tractor axle loads
  - The approved load capacities of the tractor tyres
- Secure the tractor and the machine against rolling unintentionally before coupling or uncoupling the machine.
- It is forbidden for people to stand between the machine to be coupled and the tractor whilst the tractor is moving towards the machine.

  Any helpers may only act as guides standing next to the vehicles, and may only move between the vehicles when both are at a standstill.
- Before connecting the machine to or disconnecting the machine from the tractor's three-point linkage, secure the operating lever of the tractor hydraulic system so that unintentional raising or lowering is prevented.

- When coupling and uncoupling machines, move the support equipment (if available) to the appropriate position (stability).
- When actuating the support equipment, there is a risk of injury from crushing and cutting points.
- Be particularly careful when coupling the machine to the tractor or uncoupling it from the tractor. There are crushing and cutting points in the area of the coupling point between the tractor and the machine.
- It is forbidden to stand between the tractor and the machine when actuating the three-point linkage.
- Coupled supply lines
  - must give slightly to all movements while cornering without tensioning, kinking or rubbing.
  - must not chafe against other parts.
- The release ropes for quick couplings must hang loosely and must not release themselves when lowered.
- Also ensure that uncoupled machines are stable.

Use of the machine

- Before starting work, ensure that you understand all the equipment and actuation elements of the machine and their function. There is no time for this when the machine is already in operation.
- Do not wear loose-fitting clothing. Loose clothing increases the risk of being caught by the drive shaft.
- Only start-up the machine, when all the safety equipment has been attached and is in the safety position.
- Comply with the maximum load for the connected machine and the permissible axle and drawbar loads for the tractor. If necessary, drive only with a partially filled tank.
- It is forbidden to stand in the working area of the machine.
- It is forbidden to stand in the turning and swivel range of the machine.
- There are crushing and cutting points at externally-actuated (e.g. hydraulic) machine points.
- Only actuate externally-actuated machine parts when you are sure that no-one is standing within the prescribed safety distance.

- Before leaving the tractor, secure it against unintended starting and rolling.
  To do this:
  - lower the machine onto the ground
  - apply the parking brake
  - switch off the tractor engine
  - remove the ignition key

Machine transportation

- When using public highways, national road traffic regulations must be observed.
- Before moving off, check:
  - the correct connection of the supply lines
  - the lighting system for damage, function and cleanliness
  - the brake and hydraulic system for visible damage
  - that the parking brake is completely disengaged
  - the function of the brake system
- Ensure that the tractor has sufficient steering and braking power.

  Any machines and front/rear weights connected to the tractor influence the driving behaviour and the steering and braking power of the tractor.
- If necessary, use front weights.

  The front tractor axle must always be loaded with at least 20% of the tractor empty weight, in order to ensure sufficient steering power.
- Always fix the front or rear weights to the intended fixing points according to regulations.
- Comply with the maximum load for the connected machine and the approved axle and drawbar loads for the tractor.
- The tractor must guarantee the prescribed brake delay for the loaded vehicle combination (tractor plus connected machine).
- Check the brake power before moving off.
- When turning corners with the machine connected, take the broad load and balance weight of the machine into account.
- If the machine is fixed to the tractor's three-point linkage or lower links, before moving off, ensure sufficient side locking of the tractor lower links.
- Before moving off, move all the swivellable machine parts to the transport position.
- Before moving off, secure all swivellable machine parts in the transport position against dangerous position changes. Use the transport safety catches intended for this.
- Before transportation, secure the operating lever of the three-point hydraulic system against unintentional raising or lowering of the connected or coupled machine.
- Check that the transport equipment, e.g. lighting, warning equipment and protective equipment, is correctly mounted on the machine.
- Before transportation, carry out a visual check that the upper and lower link pins are firmly fixed with the linchpin against unintentional release.
- Adjust your driving speed to the prevailing conditions.
- Before driving downhill, switch to a low gear.
- Before moving off, always switch off independent wheel braking (lock the pedals).

2.16.2 Hydraulic system

- The hydraulic system is under a high pressure.
- Ensure that the hydraulic hose lines are connected correctly.
- When connecting the hydraulic hose lines, ensure that the hydraulic system is depressurised on both the machine and tractor sides.
- It is forbidden to lock the operator controls on the tractor used for hydraulic and electrical movements of components, e.g. folding, swivelling and pushing movements. The movement must stop automatically when you release the appropriate control. This does not apply to equipment movements that:
  - are continuous
  - are automatically controlled
  - require a floating position or pressed position to function
- Before working on the hydraulic system,
  - lower the machine
  - depressurise the hydraulic system
  - shut off the tractor engine
  - apply the parking brake
  - remove the ignition key
- Have the hydraulic hose lines checked at least once a year by a specialist for proper functioning.
- Replace the hydraulic hose lines if they are damaged or worn. Only use AMAZONE original hydraulic hose lines.
- The hydraulic hose lines should not be used for longer than six years. This period includes any storage time of a maximum of two years. Even with proper storage and approved use, hoses and hose connections are subject to natural ageing, thus limiting the length of use. However, it may be possible to specify the length of use from experience values, in particular when taking the risk potential into account. In the case of hoses and hose connections made from thermoplastics, other guide values may be decisive.
- Never attempt to plug leaks in hydraulic hose lines with the hand or fingers.

  Escaping high pressure fluid (hydraulic fluid) may pass through the skin and ingress into the body, causing serious injuries.

  If you are injured by hydraulic fluid, contact a doctor immediately. Danger of infection.
- When searching for leakage points, use suitable aids, to avoid the serious risk of infection.

2.16.3 Electrical system

- When working on the electrical system, always disconnect the battery (negative terminal).
- Only use the prescribed fuses. If fuses are used with too high a rating, the electrical system will be destroyed – danger of fire.
- Ensure that the battery is connected correctly - firstly connect the positive terminal and then connect the negative terminal. When disconnecting the battery, disconnect the negative terminal first, followed by the positive terminal.
- Always place the appropriate cover over the positive battery terminal. Contact with earth may cause an explosion
- Risk of explosion: avoid the production of sparks or the presence of naked flames in the vicinity of the battery.
- The machine may be equipped with electronic components whose function is influenced by electromagnetic interference from other units. Such interference can pose risks to people, if the following safety information is not followed.
    - If retrofitting electrical units and/or components on the machine with a connection to the on-board power supply, the user is responsible for checking whether the installation might cause faults on the vehicle electronics or other components.
    - Ensure that the retrofitted electrical and electronic components comply with the EMC directive 2004/108/EC in the appropriate version and bear the CE mark.

2.16.4 Universal joint shaft operation

- Use only the PTO shafts prescribed by the AMAZONEN-WERKE factories, equipped with the proper safety devices.
- Also read and follow the operating manual from the PTO shaft manufacturer.
- The protective tube and PTO shaft guard must be undamaged, and the shield of the tractor and machine universal joint shaft must be attached and be in proper working condition.
- Work is prohibited while the safety devices are damaged.
- You may install or remove the PTO shaft only after you have done all of the following:
    - Switched off the universal joint shaft
    - Switched off the tractor engine
    - Applied the parking brake
    - the ignition key has been removed
- Always ensure that the PTO shaft is installed and secured correctly.
- When using wide-angle PTO shafts, always install the wide angle joint at the pivot point between the tractor and machine.
- Secure the PTO shaft guard by attaching the chain(s) to prevent movement.
- Observe the prescribed pipe overlaps in transport and operational positions. (Read and follow the operating manual from the PTO shaft manufacturer.)
- When turning corners, observe the permitted bending and displacement of the PTO shaft.
- Before switching on the universal joint shaft, check that the selected universal joint shaft speed of the tractor matches the permitted drive speed of the machine.
- Instruct people to leave the danger area of the machine before you switch on the universal joint shaft.
- While work is being carried out with the universal joint shaft, there must be no one in the area of the universal joint or PTO shaft while it is turning.
- Never switch on the universal joint shaft while the tractor engine is shut off.
- Always switch off the universal joint shaft whenever excessive bending occurs or it is not needed.
- WARNING! After the universal joint shaft is switched off, there is a danger of injury from the continued rotation of freewheeling machine parts.

  Do not approach the machine too closely during this time. You may work on the machine only after all machine parts have come to a complete stop.
- Secure the tractor and machine against unintentional starting and unintentional rolling before you perform any cleaning, servicing or maintenance work on universal joint shaft-driven machines or PTO shafts.
- After decoupling the PTO shaft, place it on the holder provided.

- After removing the PTO shaft, attach the protective sleeve to the universal joint shaft stub.
- When using the travel-dependent universal joint shaft, note that the universal joint shaft speed depends on the drive speed, and that the direction of rotation reverses when you drive in reverse.

2.16.5 Coupled machines

- Observe the permitted combination options of the attachment equipment on the tractor and the machine drawbar.

  Only couple permitted combinations of vehicles (tractor and attached machine).
- On single axle machines, observe the maximum permitted drawbar load of the tractor on the attachment equipment.
- Ensure that the tractor has sufficient steering and braking power.

  Machines attached or coupled to a tractor influence the driving behaviour and steering and braking power of the tractor, and in particular single axle machines with drawbar loads on the tractor.
- Only one specialist workshop can adjust the height of the drawbar if it is a straight drawbar with drawbar load.

2.16.6 Brake system

- Only specialist workshops or recognised brake services can carry out adjustment and repair work on the brake system.
- Have the brake system thoroughly checked regularly.
- If there are any malfunctions, stop the tractor immediately using the brake system. Have the malfunction rectified immediately.
- Before performing any work on the braking system, park the machine safely and secure the machine against unintentional lowering or rolling away (wheel chocks).
- Be particularly careful when carrying out any welding, torch cutting or drilling work in the area of the brake lines.
- Always carry out a braking test after any adjusting or repair work on the braking system.

Pneumatic braking system

- Before coupling the machine, clean the sealing rings on the hose couplings of the supply and brake line.
- Only move off with the machine connected when the pressure gauge on the tractor shows 5.0 bar.
- Drain the air reservoir every day.
- Before driving without the machine, lock the hose couplings on the tractor.
- Hang the hose couplings of the machine supply and brake lines in the appropriate empty couplings.
- When filling up or replacing the brake fluid, use the prescribed fluid. When replacing the brake fluid, comply with the appropriate regulations.
- Do not make any changes to the specified settings on the brake valves.
- Replace the air reservoir if:
  - the air reservoir can be moved in the tensioning belts
  - the air reservoir is damaged
  - the rating plate on the air reservoir is rusty, loose or missing.

Hydraulic brake system for export machines

- Hydraulic brake systems are prohibited in Germany.
- When filling up or replacing the brake fluid, use the prescribed hydraulic fluids. When replacing the hydraulic fluids, comply with the appropriate regulations.

2.16.7 Tyres

- Repair work on tyres and wheels may only be carried out by specialists with suitable installation tools.
- Check the air pressure at regular intervals.
- Inflate tyres to the specified pressure. If the air pressure in the tyres is too high, then there is a risk of explosions.
- Park the machine in a safe place and lock the machine against unintentional lowering and rolling (parking brake, wheel chocks), before carrying out work on the tyres.
- Tighten or retighten all the fixing screws and nuts in accordance with the specifications of AMAZONEN-WERKE.

2.16.8 Field sprayer operation

- Observe the recommendations of the crop protection agent manufacturer in respect of
  - protective clothing
  - warning information on exposure to crop protection agents
  - regulations on dosing, applications and cleaning
- Observe the information in the German Plant Protection Law.
- Never open lines which are under pressure.
- Only use genuine AMAZONE replacement hoses, which stand up to chemical, mechanical and thermal requirements. Only use hose clamps made from V2A for installation.
- The nominal volume of the spray liquid tank must not be exceeded during filling.

- **When there will be exposure to crop protection agent, wear the proper protective clothing, i.e. gloves, overalls, safety glasses, etc.**
- **When using tractors with a cab with ventilation fans, replace the fresh air filters with activated carbon filters.**
- **Observe the information on the compatibility of crop protection agents and substances for the field sprayer.**
- **Do not spray any crop protection agents which have a tendency to stick together or set.**
- **Do not fill field sprayers with water from bodies of water which are open to the public, for the protection of people, animals and the environment.**
- **Only fill field sprayers**
  - **using a free flow from the mains water supply.**
  - **using genuine AMAZONE filling equipment.**

2.16.9 Cleaning, maintenance and repairs

- Due to toxic vapours in the spray liquid tank, climbing into the spray liquid tank is always forbidden.
- Repair work in the spray liquid tank must only be carried out by a specialist workshop!
- Only carry out cleaning, maintenance and repair work on the machine when
  - the drive is switched off
  - the tractor engine has come to a complete stop
  - the ignition key has been removed
  - the machine connector has been removed from the on-board computer
- Check tightness of nuts and bolts after the first 20 operating hours and at regular intervals, and retighten as necessary.
- If the machine or parts of the machine are raised, secure them against unintentional lowering before cleaning, maintaining or repairing the machine.
- When replacing work tools with blades, use suitable tools and gloves.
- Dispose of oils, greases and filters in the appropriate way.
- Disconnect the cable to the tractor generator and battery before carrying out electrical welding work on the tractor and on attached machines.
- Spare parts must meet at least the specified technical requirements of AMAZONEN-WERKE. This is ensured through the use of AMAZONE original spare parts.
- When repairing field sprayers which have been used for liquid fertiliser application with ammonium nitrate / urea solution, observe the following points:

  Residues of ammonium nitrate / urea solutions may form salts by the evaporation of the water on or in the spray liquid tank. This produces pure ammonium nitrate and urea. In its undiluted form, ammonium nitrate is explosive when combined with organic substances, e.g. urea, and subjected to critical temperatures during repair work (e.g. welding, grinding, filing).

  This danger can be eliminated by thoroughly washing out the spray liquid tank or the parts intended for repair with water, because the salt of the ammonium nitrate / urea solution is water-soluble. For this reason, clean the field sprayer thoroughly with water before carrying out repair work.

3 Loading and unloading

Loading and unloading with a tractor

WARNING

There is a risk of accident if the tractor is unsuitable and the machine brake system is not connected to the tractor or filled.

- Couple the machine to the tractor correctly before loading the machine onto a transport vehicle or unloading it from a transport vehicle.
- You may only couple and transport the machine with a tractor for loading and unloading, if the tractor meets the necessary power requirements.

Pneumatic braking system:

- Only move off with the machine connected when the pressure gauge on the tractor shows 5.0 bar.

Loading using a lifting crane

There are 4 attachment points (Fig. 2/1) on the right and on the left of the machine.

DANGER

If loading the machine with a lifting crane, use the marked attachment points for lifting belts.

DANGER

The minimum tensile strength for each lifting belt must be

- **1000 kg.**

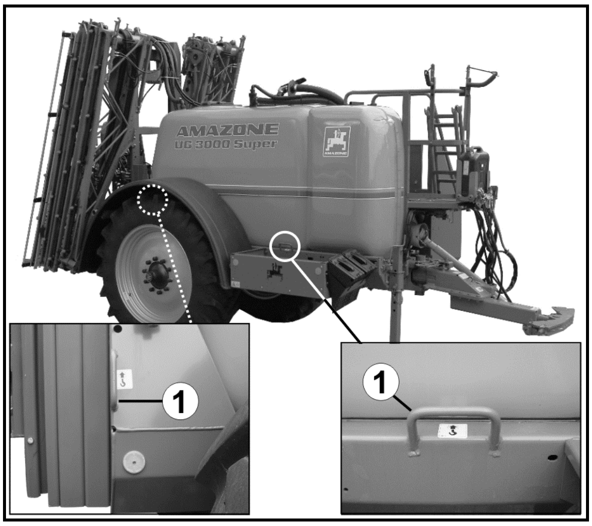


Fig. 2

4 Product description

This section:

- provides a comprehensive overview of the machine structure.
- provides the names of the individual modules and controls.

If possible, read this section when actually at the machine. This helps you to understand the machine better.

4.1 Overview of the assemblies

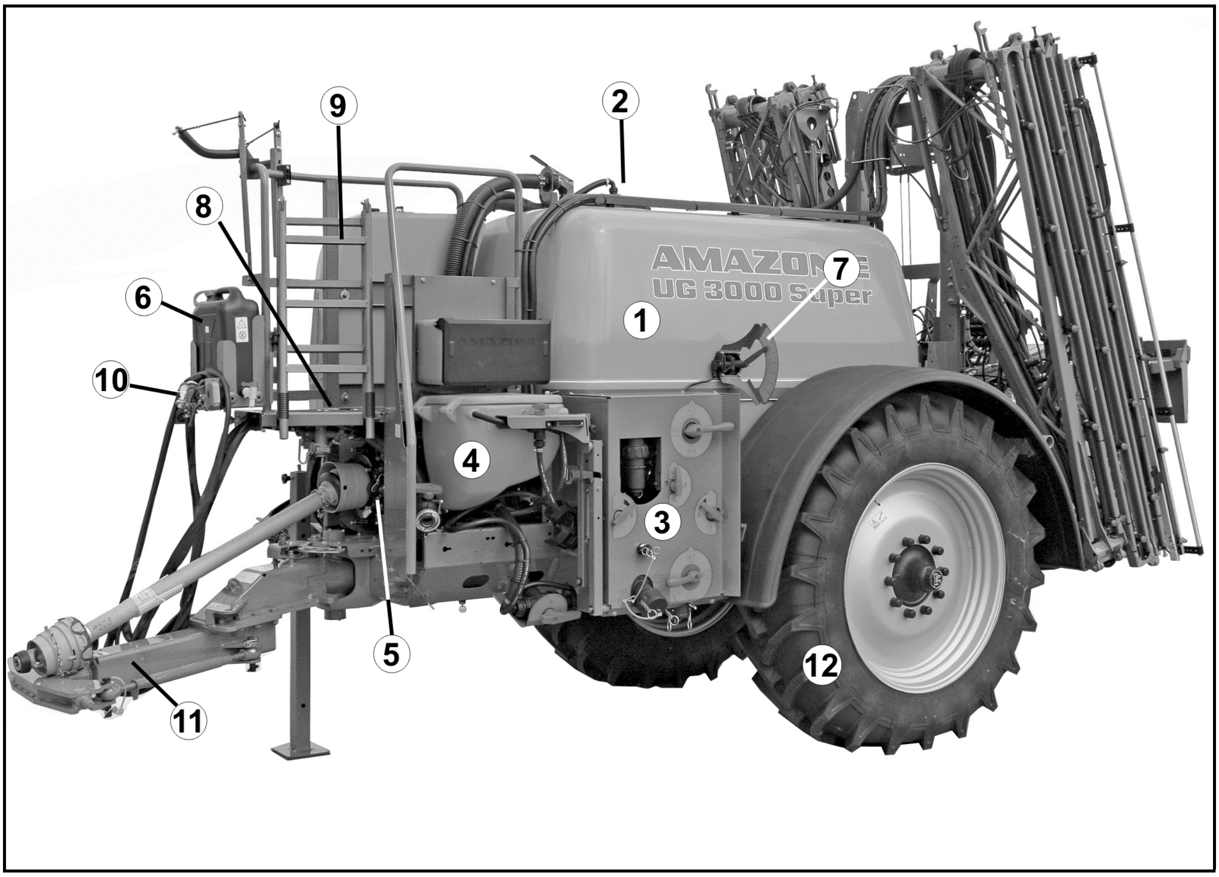


Fig. 3

Fig. 3/...

(1) Spray liquid tank

(2) Filling opening for spray liquid tank

(3) Control terminal

(4) Swivelable induction bowl

(5) Spraying pump

(6) Fresh water tank

(7) Fill level indicator spray liquid tank

(8) Maintenance platform

(9) Foldable ladder

(10) Hose cabinet

(11) Drawbar

(12) Tyres

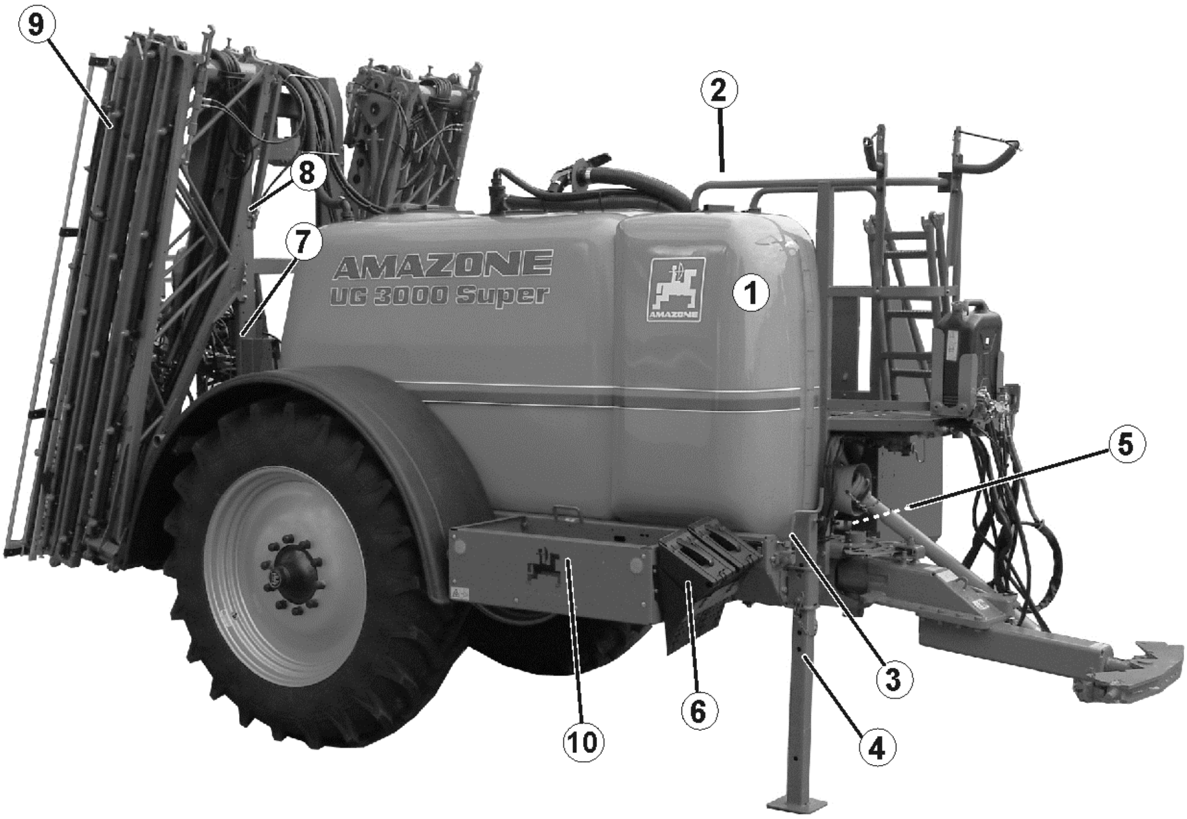

9
2
8
7
AMAZONE
UG 3000 Super
1
5
3
6
10
4

Fig. 4

Fig. 4/...

(1) Flushing water tank

(2) Flushing water tank, filling opening

(3) Parking brake

(4) Stand

(5) Pump equipment

(6) Wheel chocks

(7) Hydraulic block with system setting screw, job computer (optional)

(8) Super S sprayer boom

(9) Transport box

4.2 Safety and protection equipment

- Transport locking mechanism to prevent the Super- S boom from folding out unintentionally

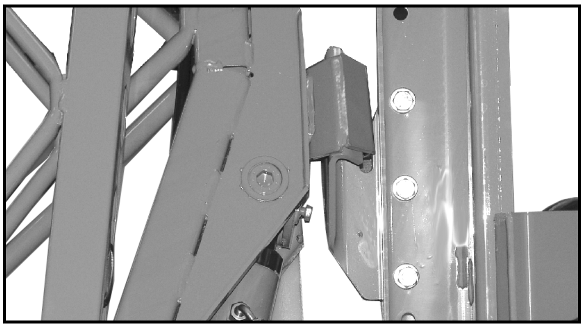


Fig. 5

- Transport locking mechanism on the Super-L1 boom to prevent unintentional unfolding.
    - Boom support on the inner boom

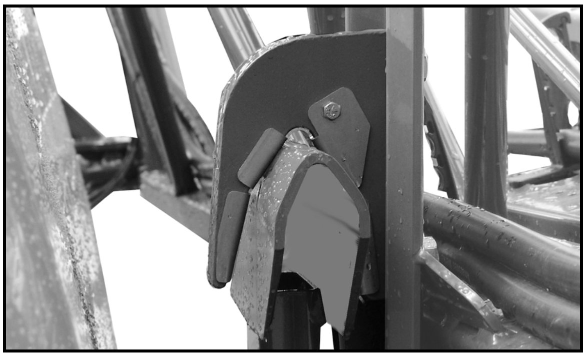


Fig. 6

    - Safety clip against unintentional unfolding

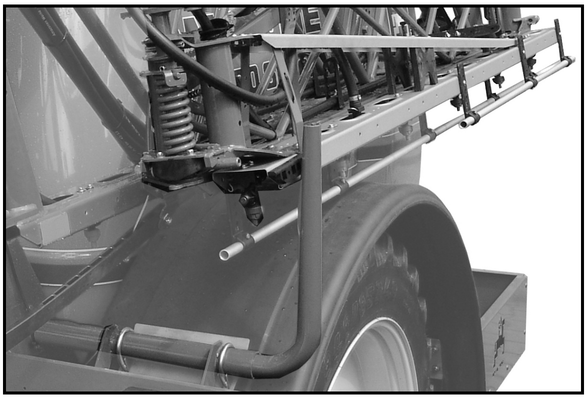


Fig. 7

- Handrail on the maintenance platform

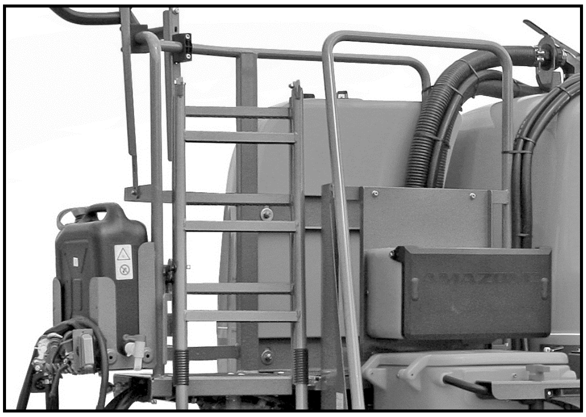


Fig. 8

- PTO shaft guard
- Machine PTO shaft guard

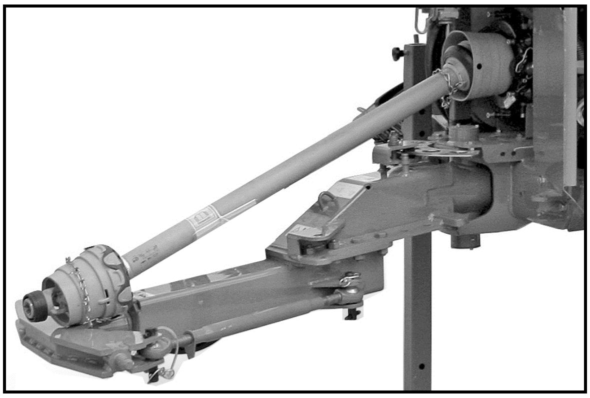


Fig. 9

- Stop tap on AutoTrail drawbar against unintentional activation of the track follow steering.

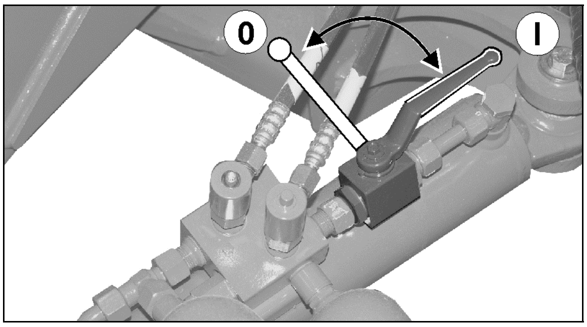


Fig. 10

4.3 Liquid circuit

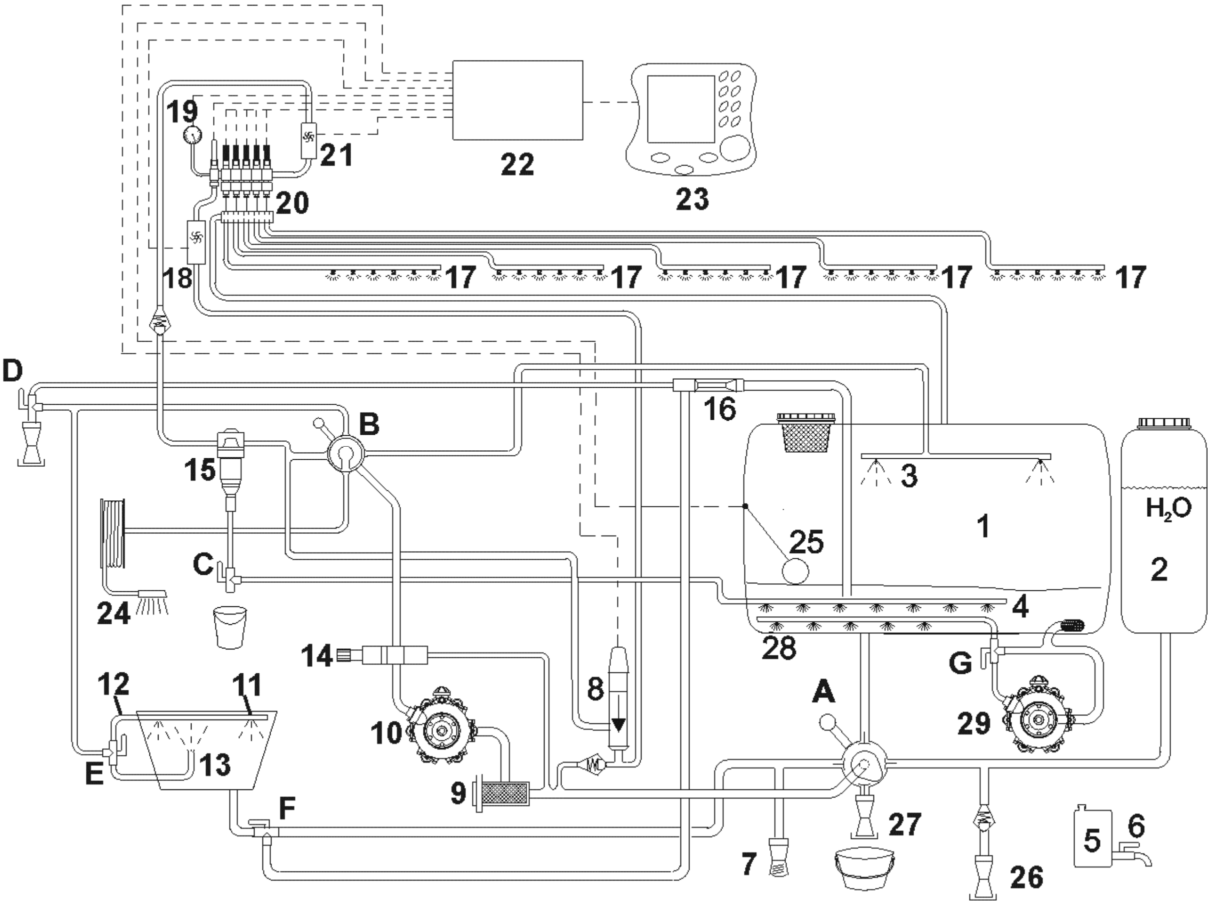


Fig. 11

Fig. 11/...

(A) VARIO switch tap, suction side

(B) VARIO switch tap, pressure side

(C) Setting tap for agitator / pressure filter draining

(D) Switch tap for fill / quick empty

(E) Switch tap for ring line induction bowl / canister flushing

(F) Switch tap for suction / induction

(G) Main agitator

(1) Spray liquid tank

(2) Flushing water tank

(3) Internal tank cleaning

(4) Agitator

(5) Hand-washing tank

(6) Tap for hand-washing tank

(7) Filling connection for suction hose

(8) Spray pressure control

(9) Suction filter

(10) Piston diaphragm pump

(11) Induction bowl

(12) Ring line

(13) Canister flushing

(14) Spray pressure limiting valve

(15) Self cleaning pressure filter

(16) Injector for extracting liquid from induction bowl

(17) Spray lines

(18) Return flow meter (for control terminal)

(19) Spray pressure sensor

(20) Part width section valves

(21) Flow meter

(22) Machine computer (for control terminal)

(23) Control terminal or AMASPRAY$^+$

(24) External washing system

(25) Fill level gauge

(26) Flushing water filling coupling

(27) Complete discharging

(28) Main agitator

(29) Agitator pump

4.4 Supply hoses between the tractor and the machine

Supply hoses in parking position:

Fig. 12/...

(1) Hydraulic hose lines (depending on equipment)

(2) Electric cable for lighting

(3) Machine cable with machine connector for operating terminal

(4) Brake line with coupling head for air brake
Alternatively:
Brake line with connection to hydraulic brake

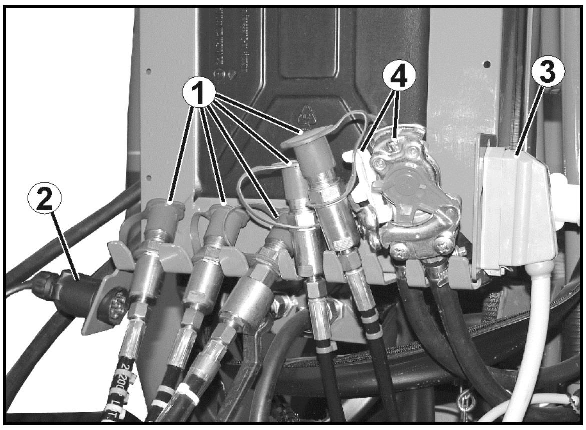


Fig. 12

4.5 Transportation equipment

Fig. 13/...

(1) rear lights, brake lights, turn

(2) 2 warning signs (square)

(3) 2 red reflectors (triangular)

(4) 1 registration plate holder with lighting

(5) Reflector on the side of the boom

(6) Additional rear light and brake light

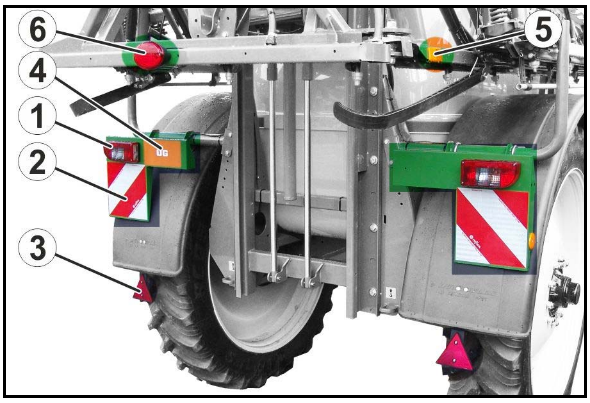


Fig. 13

Fig. 14/...

(1) 2 x 3 reflectors, yellow
(lateral view: distance of max. 3m)

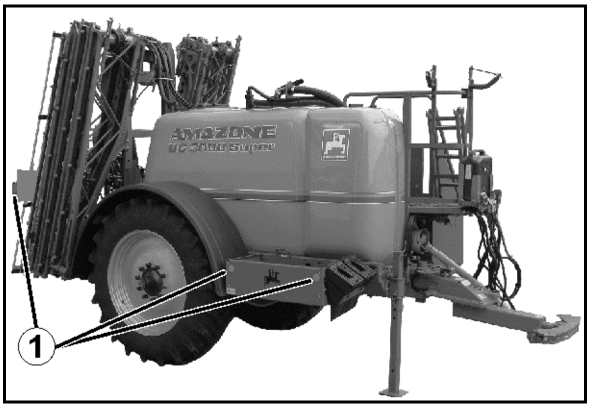


Fig. 14

Connect the lighting system via the connector to the 7-pin tractor socket.

For France, additional lateral danger signs and warning beacon on the sprayer boom are required.

4.6 Intended use

The field sprayer

- is intended for the transportation and application of crop protection agents (insecticides, fungicides, herbicides, etc.) in the form of suspensions, emulsions and mixtures, as well as of liquid fertilisers.
- uses state-of-the-art technology to ensure organic success, provided that all the correct adjustments are made and correct doses applied. Economical use of spraying agents and low rates of pollution are achieved.
- is intended exclusively for agricultural use, for treating field crops

Sloping terrain can be traversed as follows:

- Along the contours

Direction of travel to left	15 %
Direction of travel to right	15 %

- Along the gradient

Up the slope	15 %
Down the slope	15 %

Using the steering drawbar with AutoTrail control for precise tracking is prohibited if on sloping terrain. See page 72.

"Intended use" also covers:

- Compliance with all the instructions in this operating manual.
- Execution of inspection and maintenance work.
- Exclusive use of genuine AMAZONE spare parts.

Other uses to those specified above are forbidden and shall be considered as improper.

For any damage resulting from improper use:

- the operator bears the sole responsibility,
- AMAZONEN-WERKE accepts no liability.

4.7 Regular device inspections

The implement underlies the European Union universally applicable regular device inspections (Crop Protection Directive 2009/128/EC and EN ISO 16122)).

Have the device inspected at regular intervals by a recognised and certified inspection workshop.

The date for performing the next device inspection is written on the inspection plate on the implement.

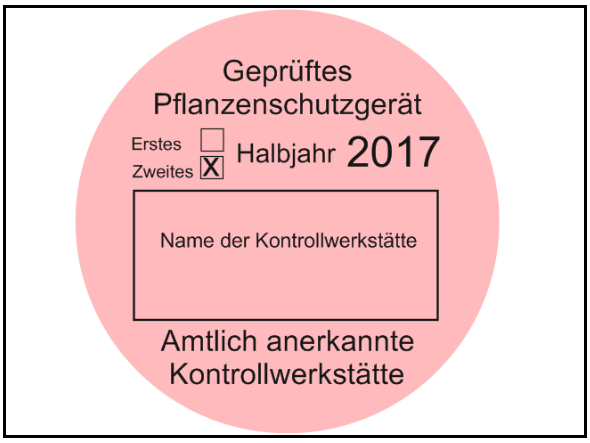

Geprüftes Pflanzenschutzgerät
Erstes ☐
Zweites ☒
Halbjahr 2017
Name der Kontrollwerkstätte
Amtlich anerkannte Kontrollwerkstätte

Fig. 15

Fig. 15: German inspection plate

4.8 Consequences of using certain crop protection agents

We would like to draw attention to the fact that extended exposure (20 hours) to crop protection agents with which we are familiar, e.g. Lasso, Betanal and Tramat, Stomp, Iloxan, Mudecan, Elancolan and Teridox, can cause damage to the pump diaphragms, hoses, spray lines and tanks. The examples given are in no way intended to represent a comprehensive list.

In particular, we warn against unauthorised mixtures of two or more different crop protection agents.

Substances which have a tendency to stick together or set must not be applied.

When using such aggressive crop protection agents, it is recommended that the spray liquid be applied immediately after preparation and then that the sprayer be thoroughly cleaned with water.

Viton membranes are available as replacements for pumps. These are resistant to solvent-containing crop protection agents. However their service life is reduced by use at low temperatures (e.g. AUS in frosty conditions).

The materials and components used in the construction of AMAZONE field sprayers are safe for liquid fertiliser.

4.9 Danger areas and danger points

The danger area is the area around the machine in which people can be caught by:

- work movements made by the machine and its tools
- materials or foreign bodies thrown out of the machine
- tools rising or falling unintentionally
- unintentional rolling of the tractor and the machine

Within the machine danger area, there are danger points with permanent or unexpected risks. Warning symbols indicate these danger points and warn against residual dangers, which cannot be eliminated for practical reasons. In such cases, the special safety regulations in the appropriate section are valid.

No-one may stand in the machine danger area:

- if the tractor engine is running with the PTO shaft / hydraulic system connected.
- if the tractor and machine are not protected against unintentional start-up and rolling.

The operating person may only move the machine or switch or drive the tools from the transport position to the working position or vice-versa when there is no-one in the machine danger area.

Danger points exist:

- between the tractor and field sprayer, particularly when coupling and uncoupling.
- where there are moving components.
- on the moving machine.
- in the swivel range of the sprayer boom.
- in the spray liquid tank due to poisonous vapours.
- under raised, unsecured machines or machine parts.
- when unfolding/folding the sprayer boom in the vicinity of overhead electricity cables, through contact with the cables.

4.10 Rating plate and CE mark

The type plate and CE sign are located on the front frame in the direction of travel.

The rating plate shows:

- Vehicle- / machine ID no.:
- Type
- Basic weight kg
- Permissible support load kg
- Permissible rear axle load kg
- Permissible system pressure bar
- Permissible total weight kg
- Factory
- Model year

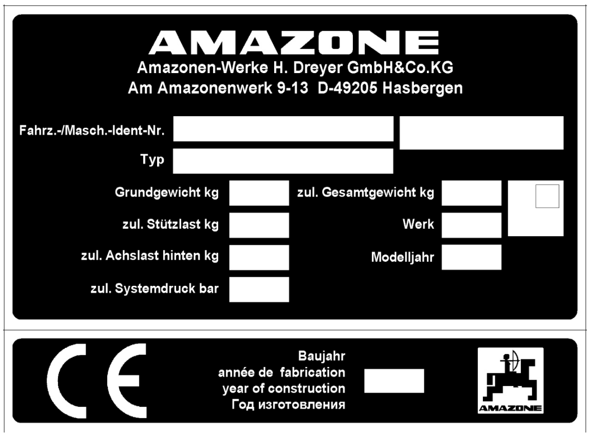

AMAZONE
Amazonen-Werke H. Dreyer GmbH&Co.KG
Am Amazonenwerk 9-13 D-49205 Hasbergen
Fahrz.-/Masch.-Ident-Nr.
Typ
Grundgewicht kg
zul. Gesamtgewicht kg
zul. Stützlast kg
Werk
zul. Achslast hinten kg
Modelljahr
zul. Systemdruck bar
CE
Baujahr
année de fabrication
year of construction
Год изготовления
AMAZONE

Fig. 16

4.11 Conformity

The implement complies with the

Directives/Standards designation	
Implement directive	2006/42/EC
EMC directive	2004/108/EC

4.12 Maximum permissible application rate

The permissible application rate of the implement is limited by:

- the legally required agitator capacity.

  The permissible application rate is of particular importance for materials that require a high agitating intensity.
- the technical maximum application rate of 200 l/min (without HighFlow).

Determining the permissible application rate depending on the agitator capacity

Calculation formula for the application rate in l/min:

(The agitator capacity per minute must be 5% of the hopper volume)

Permissible application rate [l/min]	=	Pump capacity [l/min] (See page 91)	-	0.05 x nominal tank volume [l] (See page 49)

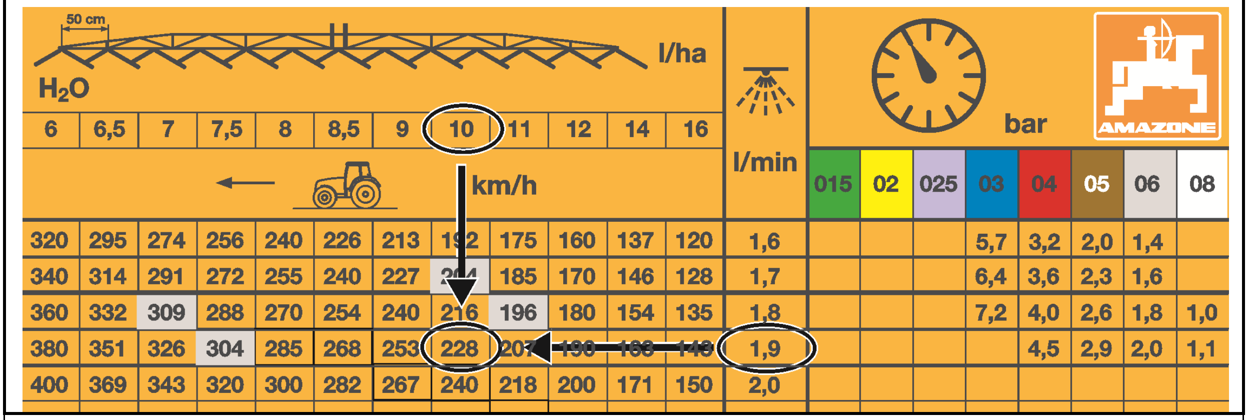
Conversion of the application rate in l/ha:

1. Determine the application rate per nozzle (divide the permissible application rate by the number of nozzles).
2. Read the application rate per hectare depending on the speed from the spray table (See page 230).

Example: UG 3000, pump BP 280, Super S 24 m, 48 nozzles, 10 km/h

Permissible application rate = 240 l/min - 0,05 x 3000 l = 90 l/min

→ Application rate per nozzle = 1,9 l/min


50 cm
H₂O
l/ha
km/h
bar
AMAZONE

6	6,5	7	7,5	8	8,5	9	10	11	12	14	16	l/min	015	02	025	03	04	05	06	08
320	295	274	256	240	226	213	192	175	160	137	120	1,6				5,7	3,2	2,0	1,4	
340	314	291	272	255	240	227	204	185	170	146	128	1,7				6,4	3,6	2,3	1,6	
360	332	309	288	270	254	240	216	196	180	154	135	1,8				7,2	4,0	2,6	1,8	1,0
380	351	326	304	285	268	253	228	207	190	163	143	1,9					4,5	2,9	2,0	1,1
400	369	343	320	300	282	267	240	218	200	171	150	2,0								

→ Permissible application rate per hectare = 228 l/ha

4.13 Technical data

The following tables show the technical data for the individual assemblies. Combining individual assemblies results in many model variants so, for example, to determine the total weight, add the respective weights of the individual assemblies.

Typ UG		2200	3000
Spray liquid tank	[l]		
• Actual volume		2400	3200
• Nominal volume		2200	3000
Filling height from the maintenance platform	[mm]	650	1000
Permissible system pressure	[bar]	10	
Length	[mm]	5200 – 5900	
Width	[mm]	2400	
Height	[mm]	3300	
Technical residue incl. pump			
• On the flat	[l]	6	17
• Along the contours			
o Direction of travel 20 % to left		15	26
o Direction of travel 20 % to righ		15	26
• Along the gradient **			
o 16% up the slope		45	56
o 20% down the slope		47	58
Central switching mechanism		Electric, part width section valve coupling	
Spray pressure adjustment		Electric	
Spray pressure setting range	[bar]	0,8 – 10	
Spray pressure display		digital spray pressure display	
Pressure filter		50 (80,100) Maschen	
Agitator		Infinitely adjustable	
Nozzle height	[mm]	500 - 2500	

Payload = permissible total weight - basic weight

DANGER

Exceeding the permitted payload is prohibited.

Risk of accident because of unstable driving conditions.

Carefully determine the payload, and therefore the permitted filling amount for your machine. Not all filling media can be used to fill the tank completely.

4.13.1 Weights basic machine and modules

The basic weight (empty weight) is calculated from the sum of basic machine, listed assemblies and sprayer boom.

UG Super / Special	[kg]	2200	3000
Basic machine			
• unbraked		1000	1050
• braked		1110	1160
Drawbar			
• Track follow drawbar		122	
• Universal drawbar		204	
• Yoke bar		198	
• Hitch draw bar		172	
Drawbar control			
• Drawbar control I		20	
• AutoTrail		42	
Pump equipment			
• 250 l/min		34	
• 210 l/min und 160 l/min		68	
Tyres (in pairs)			
• 230/95R44		358	
• 230/95R48		390	
• 270/95R42		384	
• 270/95R48		412	
• 300/95R46		440	
• 340/85R48		520	
• 420/85R38		470	
• 460/85R38		496	
• 520/85R38		600	
Control units TG		38	
Other special equipment		maximal 90	

Super-S booms:

Working width	**[m]**	**15**	**16**	**18**	**20**	**21**	**21/15**	**24**	**27**	**28**
Weight	**[kg]**	505	513	519	631	634	629	651	690	691

Super-L1- booms

Working width	**[m]**	**21**	**24**	**27**	**28**
Weight	**[kg]**	690	710	740	750

4.13.2 Permissible total weight and tyres

The permissible total weight of the machine depends on the

- permitted drawbar load
- permitted axle load
- permitted load capacity per pair of tyres

The permissible total weight is the total of

- the permitted drawbar load and
- one of the following (whichever is smaller):
  - permitted axle load
  - permitted load capacity for each pair of wheels.

Please refer to the following tables for the values used for determining the permissible total weight.

Permitted drawbar load

UG 2200	max. 800 kg
UG 3000	max. 1000 kg

Permitted axle load

	Braked up to 25 km/h	Braked up to 40 km/h	Unbraked up to 25 km/h
Permitted axle load in [kg]	6500	6000	3000

Load capacity for each pair of wheels

	Tyres	Load index	25 km/h	40 km/h
			permitted load capacity [kg] **at air pressure [b]**	**permitted load capacity [kg]** **at air pressure [b]**
1	230/95 R44	LI 134 A8	4700 3,6	4240 3,6
2	230/95 R48	LI 134 A8	4700 3,6	4240 3,6
3	270/95 R42	LI 139 A8	5390 3,6	4860 3,6
4	270/95 R48	LI 142 A8 LI 140 B	5880 3,6	5300 3,6
5	300/95 R46	LI 146 A8 LI 146 B	6660 3,6	6000 3,6
6	340/85 R48	LI 148 A8	6990 3,6	6300 3,6
7	420/85 R38	LI 141 A8	5710 1,6	5150 1,6
8	460/85 R38	LI 146 A8 LI 143 B	6660 1,6	6000 1,6
9	520/85 R38	LI 155 A8 LI 152 B	8600 1,6	7750 1,6

Table 1

Driving with reduced tyre pressure

- The tyre pressure given in table 1 is required for achieving the permitted load capacity.
- If the tyre pressure is lower, the load capacity will also be lower, as shown in table 2.

  If this is the case, please also note the reduced payload of the machine.
- Please additionally follow the specifications of the tyre manufacturer!

Tyres 1 – 6, table 1

Air pressure [b]	2.4	2.8	3.2	3.6
max. load capacity (%)	79	86	93	100

Tyres 7 – 9, table 1

Air pressure [b]	1.6	1.8	2.1	2.4
max. load capacity (%)	79	86	93	100

Table 2

WARNING

Never select air pressure lower than the values given in table 2. Vehicle stability is no longer guaranteed.

Risk of accident.

4.14 Noise emissions data

The workplace-related emissions value (acoustic pressure level) is 74 dB(A), measured during operation at the ear of the tractor driver with the cab closed.

Measuring unit: OPTAC SLM 5.

The noise level is primarily dependent on the vehicle used.

4.15 Required tractor equipment

For the machine to be operated as intended, the tractor must fulfil the following requirements:

Tractor engine power

UG 2200	from 65 kW (90 hp) upwards
UG 3000	from 75 kW (100 hp) upwards

Electrical system

Battery voltage:	• 12 V (volts)
Lighting socket:	• 7 pin

Hydraulic system

Maximum operating pressure:	• 210 bar
Tractor pump capacity:	• At least 25 l/min at 150 bar for the hydraulic block (with Profi-folding, optional)
Machine hydraulic fluid:	• HLP68 DIN 51524 The implement hydraulic fluid is suitable for the combined hydraulic fluid circuits of all standard tractor brands
Control units	• Depending on the equipment, see Seite 64.

Service brake system (depending on equipment)

Dual circuit service brake system: or	• 1 hose coupling (red) for the supply line • 1 hose coupling (yellow) for the brake line
Single circuit service brake system:	• 1 service line hose coupling for the brake line
or	
Hydraulic brake system:	• 1 hydraulic coupling, conforms to ISO 5676

The hydraulic brake system is prohibited in Germany and several other EU countries.

Universal joint shaft (depending on equipment)

Required speed:	• 540 rpm
Direction of rotation:	• Clockwise, viewed from rear toward the tractor.

5 Structure and function

The following section provides information on the machine structure and the functions of the individual components.

5.1 Functionality

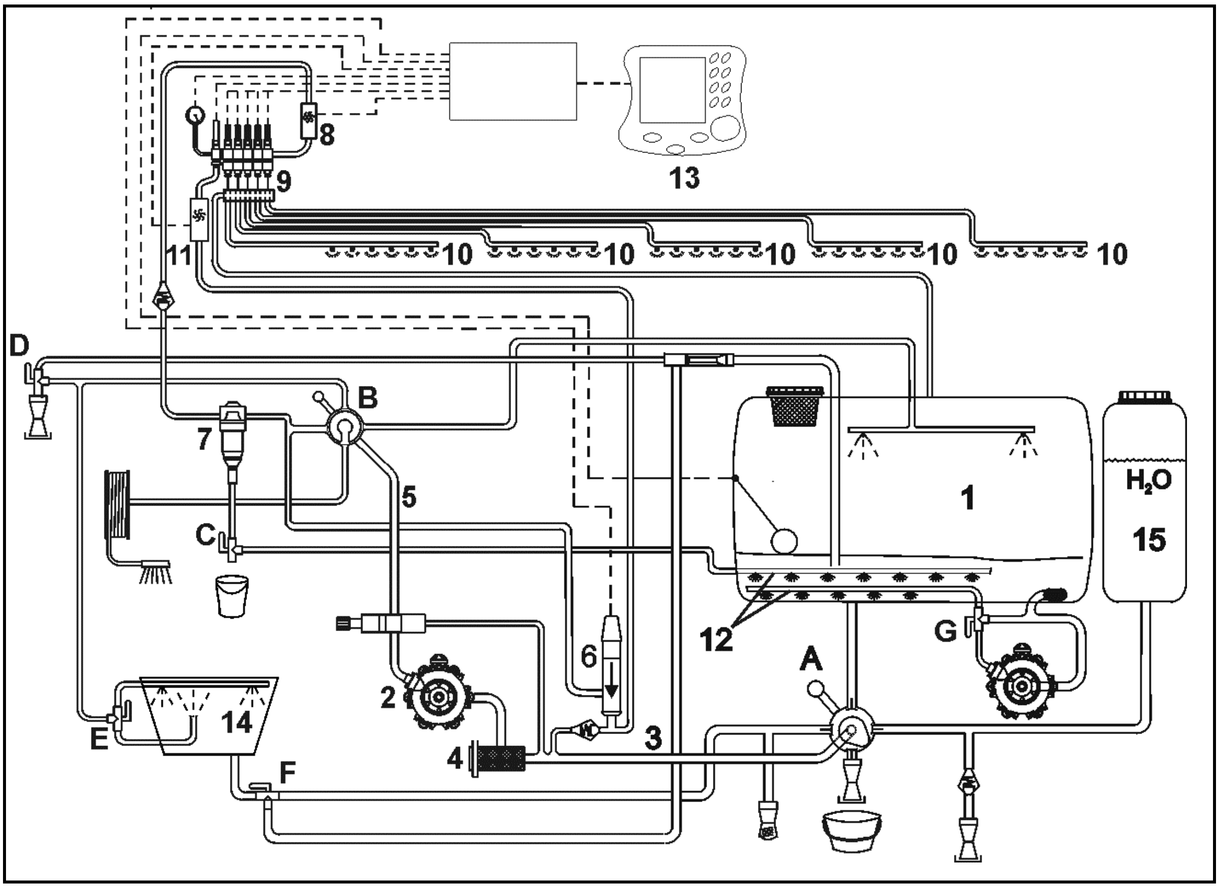


Fig. 17

The piston diaphragm pump (2) draws the spray liquid from the spray liquid tank (1) via the VARIO switch tap, suction side (A), the suction line (3) and the suction filter (4). The spray liquid which is drawn up is conveyed via the pressure hose (5) to the VARIO switch tap, pressure side (B). The liquid reaches the pressure gauge via the VARIO switch tap, pressure side (B). The pressure gauge consists of the spray pressure control (6) and the self cleaning pressure filter (7). From the pressure gauge, the spray liquid is conveyed via the flow meter (8) to the part width section valves (9). The part width section valves take on the task of distributing the liquid to the individual spray lines (10). The return flow meter (11) (control terminal only) determines the quantity of spray liquid to be conveyed back to the spray liquid tank in the case of a low application rate.
In its switched-on state, the agitator (12) ensures that the spray liquid in the spray liquid tank remains homogenous. The stirring performance of the agitator can be set at the setting tap (C- Additional agitator, G Main agitator only with UG Super).

The field sprayer is operated from the tractor via

- the AMATRON 3 control terminal (13) or
- the AMASPRAY$^+$ control terminal.

To prepare the spray liquid, fill the induction bowl (14) with the agent quantity required to fill the spray liquid tank, and draw it into the spray liquid tank.
The fresh water from the flushing water tank (15) is used for cleaning the spraying system.

5.2 Control terminal

The relevant operation modes are set centrally on the control terminal, using the various control elements.

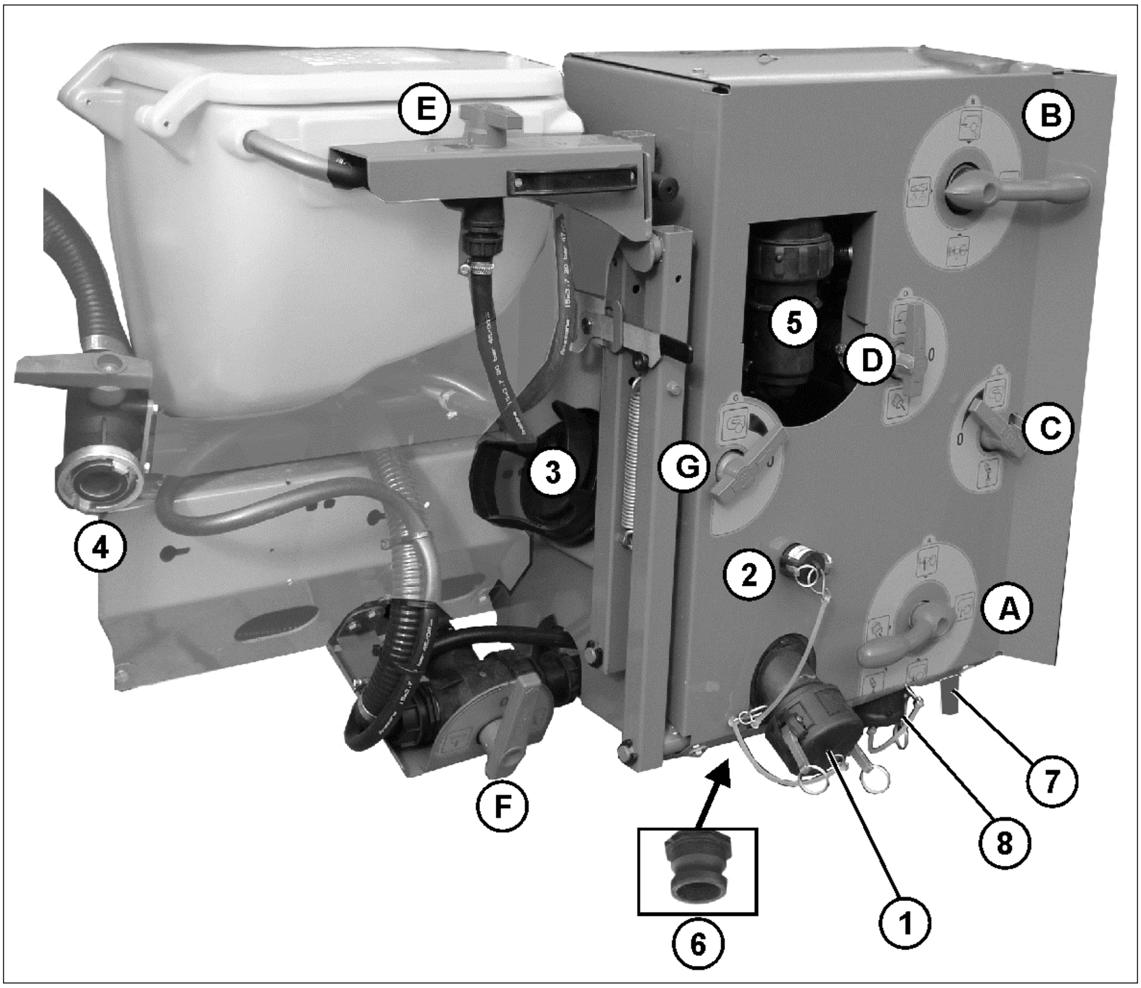


Fig. 18

(1) Spray liquid tank filling connection (via suction hose)

(2) Flushing water tank filling connection

(3) Suction filter

(4) Filling connection for spray liquid tank (optional)

(5) Self-cleaning pressure filter

(6) Quick emptying via pump

(7) Pressure filter drain hose

(8) Drain for spray liquid

(9) Fill level indicator for fresh water

(10) Connection for Ecofill

(11) Connection for Ecofill flushing

(A) VARIO switch tap, suction side

(B) VARIO switch tap, pressure side

(C) Setting tap for agitator / pressure filter draining

(D) Switch tap for fill / quick empty

(E) Switch tap for ring line induction bowl / canister flushing

(F) Switch tap for suction / induction

(G) Setting tap for main agitator (UG Super)

- **A – VARIO switch tap, suction side**
  - Draw from an external source
  - Draw from the flushing water tank
  - Draw from the spray tank
  - Drain the technical residue from the spray liquid tank
  - Drain the technical residue from the suction chest and suction filter

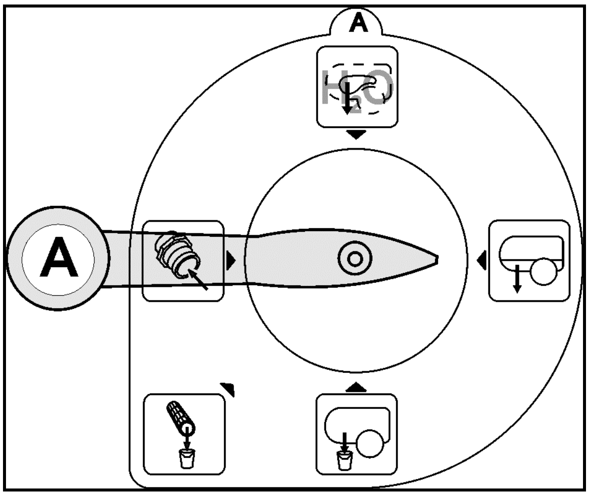


Fig. 19

- **B – VARIO switch tap pressure side**
  - Spraying operation
  - Filling / quick emptying (optional, D)
  - Internal tank cleaning with flushing water (H_2O)
  - External cleaning with flushing water (H_2O)

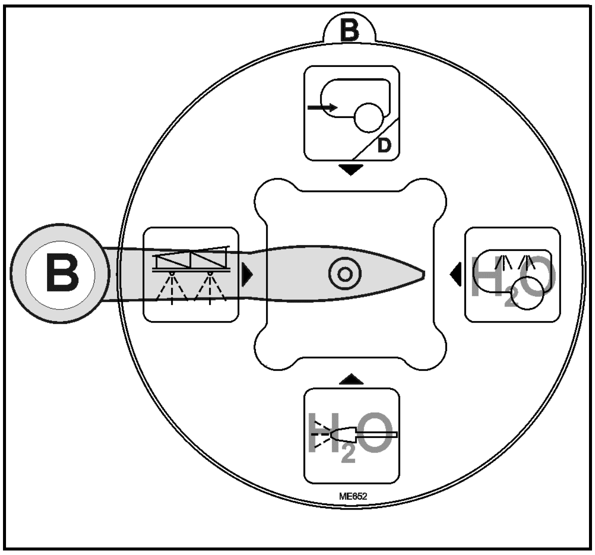


Fig. 20

- **C – Setting tap for agitator / drain pressure filter**
  - Agitator
  - 0 Zero setting
  - Drain technical residue from pressure filter

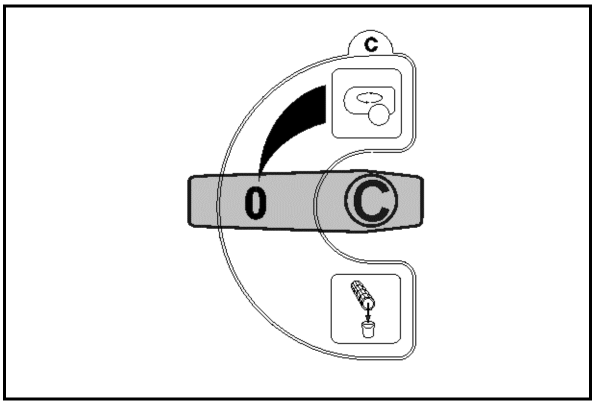


Fig. 21

- **D – Filling switch tap / Rapid draining (optional)**
  - Filling
  - 0 Zero setting
  - Quick emptying

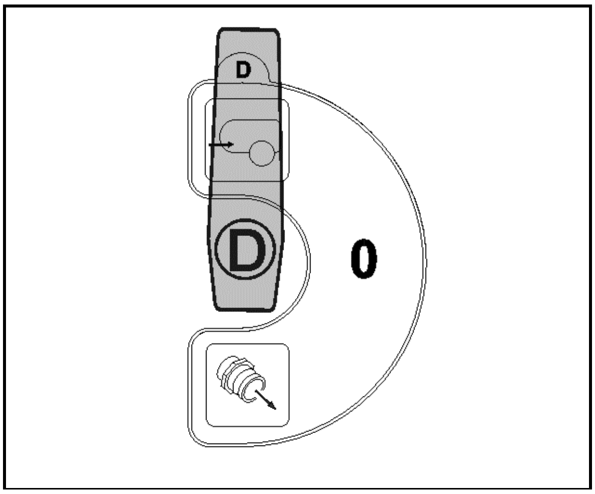


Fig. 22

- **E – Switch tap for ring line induction bowl / canister flushing**
  - Ring line
  - **0** Zero setting
  - Canister flushing

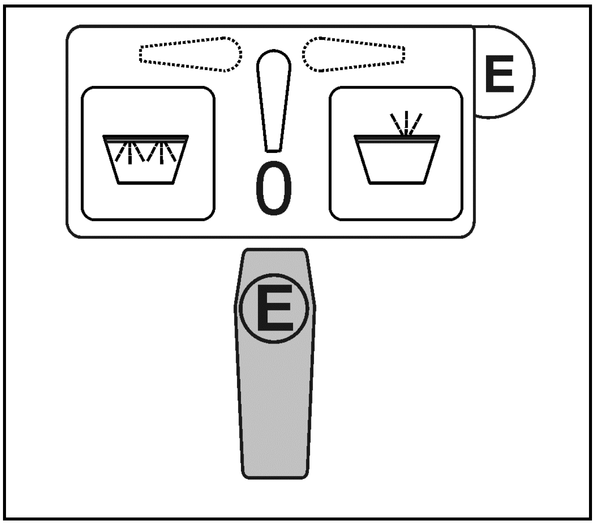


Fig. 23

- **F – Switch tap for suction / induction**
  - Draw in additionally from an external source via an injector.
  - **0** Zero setting
  - Evacuate induction bowl

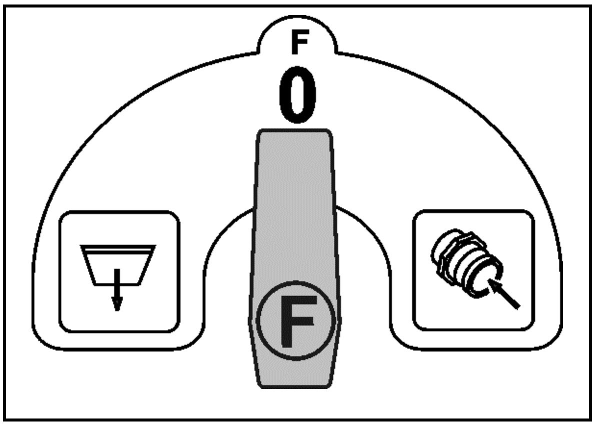


Fig. 24

- **G – Setting tap for main agitator**
  - Agitator
  - **0** Zero setting

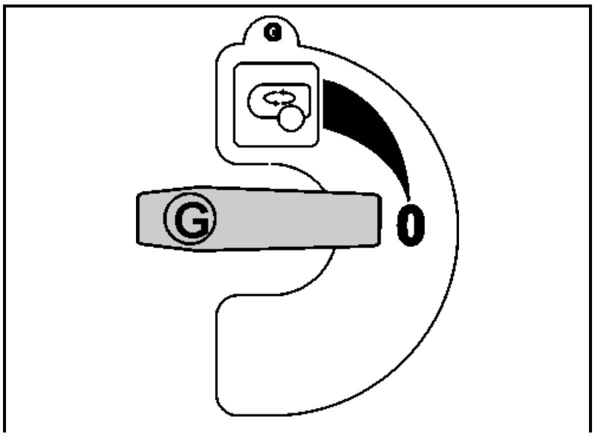


Fig. 25

All stop taps are

- open when lever position is in direction of flow
- closed when lever position is transverse to direction of flow

5.3 PTO shaft

The wide angle PTO shaft takes on the power transmission between tractor and machine.

Fig. 26:

- Wide angle PTO shaft (860 mm) for straight drawbar and hitch draw bar
- Russia only:
  Wide angle PTO shaft (860 mm) for straight drawbar and hitch draw bar
- Wide angle PTO shaft W100E (810 mm) for open straight drawbar, hitched at the top

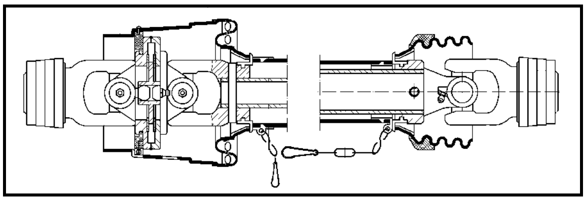


Fig. 26

WARNING

Risk of crushing from the tractor and machine unintentionally starting up or rolling.

Only couple/uncouple the wide angle PTO shaft from the tractor, if the tractor and machine are secured against unintentional starting and rolling.

WARNING

Risk of being caught and drawn in by the unguarded PTO shaft or due to damaged safety devices.

- Never use the PTO shaft if the safety device is missing or damaged, or without correctly using the supporting chain.
- Before each use, check that
  - all PTO shaft protective devices are installed and fully functional.
  - the clearance around the PTO shaft is sufficient in all operating positions. Insufficient clearance will result in damage to the PTO shaft.
- Attach the supporting chains in a way that ensures a sufficient swivel range of the PTO shaft in all operating positions. Supporting chains must not become caught on machine or tractor parts.
- Have any damaged or missing parts of the PTO shaft replaced immediately with genuine parts from the PTO shaft manufacturer.
  Note that only a specialist workshop may repair a PTO shaft.
- With the machine uncoupled, place the PTO shaft in the holder provided. This protects the PTO shaft from damage and dirt.
  - Never use the supporting chain of the PTO shaft to suspend the uncoupled PTO shaft.

WARNING

Risk of being caught and drawn in by unguarded PTO shaft parts in the power transmission area between the tractor and driven machine.

Work only when the drive between the tractor and driven machine is fully guarded.

- The unguarded parts of the PTO shaft must always be guarded by a shield on the tractor and a PTO shaft guard on the machine.
- Check that the shield on the tractor or the PTO shaft guard on the machine and the safety devices and guards of the extended PTO shaft overlap by at least 50 mm. If they do not, you must not power the machine via the PTO shaft.

- Use only the PTO shaft provided or one of the same type.
- Read and follow the operating manual provided for the PTO shaft. Correct use and maintenance of the PTO shaft prevents serious accidents.
- When coupling the PTO shaft
    - refer to the operating manual provided for the PTO shaft.
    - observe the permissible drive speed of the machine.
    - observe the correct installation length of the PTO shaft. Refer to the section "Adjusting the length of the PTO shaft to the tractor", page 133.
    - observe the correct installation position of the PTO shaft. The tractor symbol on the protective tube of the PTO shaft identifies the tractor-side connection of the PTO shaft.
- Always mount the overload or freewheel clutch on the machine if the PTO shaft has an overload or freewheel clutch.

- Before activating the universal joint shaft, refer to the safety instructions for the universal joint shaft, page 32.

5.3.1 Coupling the PTO shaft

WARNING

Risk of crushing or impact if there is insufficient clearance when coupling the PTO shaft.

Couple the PTO shaft with the tractor before coupling the machine with the tractor. This will ensure the necessary clearance for safe coupling of the PTO shaft.

1. Drive the tractor up to the machine, leaving a clearance (approx. 25 cm) between the tractor and the machine.
2. Secure the tractor against unintentional starting and unintentional rolling away, see page 135.
3. Check whether the tractor universal joint shaft is switched off.
4. Clean and grease the tractor universal joint shaft.
5. Fit the latch of the PTO shaft over the universal joint shaft of the tractor until the latch is heard to engage. When coupling the PTO shaft, refer to the operating manual provided for the PTO shaft and observe the permissible universal joint shaft speed of the machine.

The tractor symbol on the protective tube of the PTO shaft identifies the tractor-side connection of the PTO shaft.

6. Secure the PTO shaft guard using the supporting chain(s) to prevent movement.
   6.1 Fasten the supporting chain(s) so that it as perpendicular to the PTO shaft as possible.
   6.2 Attach the supporting chain(s) in a way that ensures sufficient swivel range of the PTO shaft in all operating positions.

CAUTION

Supporting chains must not become caught on machine or tractor parts.

7. Check that there is sufficient clearance around the PTO shaft in all operating conditions. Insufficient clearance will result in damage to the PTO shaft.
8. Provide the necessary clearance (if required).

5.3.2 Uncoupling the PTO shaft

WARNING

Risk of crushing or impact if there is insufficient clearance when uncoupling the PTO shaft.

First uncouple the machine from the tractor before uncoupling the PTO shaft from the tractor. This will ensure the necessary clearance for safe uncoupling of the PTO shaft.

CAUTION

Risk of burning on hot components of the PTO shaft.

This danger can cause minor to serious injuries to the hands.

Do not touch components of the PTO shaft that have become hot (particularly clutches).

- Store the uncoupled PTO shaft in the holder provided. This protects the PTO shaft from damage and dirt.

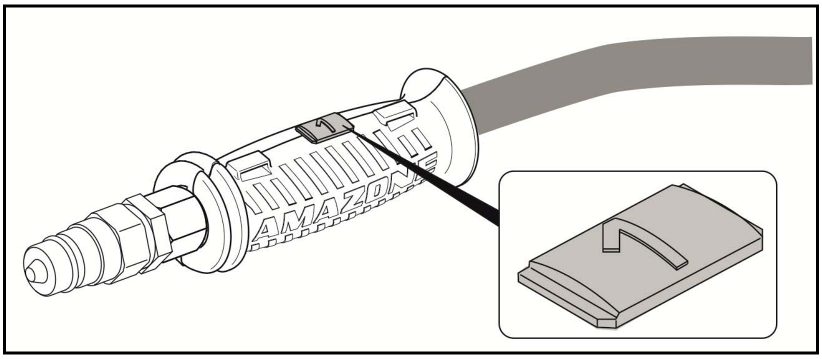
  Never use the supporting chain on the PTO shaft to hang up the uncoupled PTO shaft.
- Clean and lubricate the PTO shaft if it is going to be out of use for a long time.

1. Uncouple the machine from the tractor. See page 141.
2. Drive the tractor up to the machine, leaving a clearance of approximately 25 cm between the tractor and the machine.
3. Secure the tractor and machine against unintentional starting and rolling away, see page 135.
4. Withdraw the PTO shaft from the universal joint shaft of the tractor.
5. Place the PTO shaft in the holder provided.
6. Clean and lubricate the PTO shaft if it is not going to be used for a longer period of time

5.4 Hydraulic connections

- All hydraulic hose lines are equipped with grips.

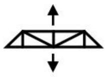
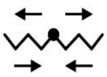
  Coloured markings with a code number or code letter have been applied to the gripping sections in order to assign the respective hydraulic function to the pressure line of a tractor control unit!



  Films are stuck on the implement for the markings that illustrate the respective hydraulic function.

- The tractor control unit must be used in different types of activation, depending on the hydraulic function.

Latched, for a permanent oil circulation	∞
Tentative, activate until the action is executed	◷
Float position, free oil flow in the control unit	∿

Marking		Function			Tractor control unit	
yellow	1		**height adjustment**	raise	Double acting	◷
	2			lower		
yellow	3		Lift module (optional**)**	raise	Double acting	◷
	4			lower		
green	1		**fold boom**	fold out	Double acting	◷
	2			fold in		
natural	1		**tilt adjustment (optional)**	raise left boom	Double acting	◷
	2			raise right boom		
blue	1		**steering drawbar (optional)**	extend hydraulic cylinder (machine left)	Double acting	◷
	2			retract hydraulic cylinder (machine right)		

Profi-folding

Marking		Function	Tractor control unit	
red	P	Permanent oil circulation	Single-acting	∞
red	T	Pressure-free return flow		

WARNING

Risk of infection from hydraulic fluid escaping at high pressure.

When coupling/uncoupling the hydraulic hose line, ensure that the hydraulic system is not under pressure on the tractor or machine side.

If you are injured by hydraulic fluid, contact a doctor immediately.

Profi-folding:

Maximum permissible pressure in oil return: 5 bar

Therefore do not connect the oil return to the tractor control unit, but to a pressure-free oil return flow with a large plug coupling.

WARNING

For the oil return, use only DN16 lines and select short return paths.

Pressurise the hydraulic system only when the free return has been correctly coupled.

Install the coupling union (supplied) on the pressure-free oil return flow.

5.4.1 Coupling hydraulic hose lines

WARNING

Risk of crushing, cutting, being trapped or drawn in, or impact through faulty hydraulic functions when hydraulic hose lines are incorrectly connected.

When coupling the hydraulic hose lines, please note the coloured markings on the hydraulic plugs.

- Check the compatibility of the hydraulic fluids before connecting the machine to the tractor hydraulic system.
  Do not mix any mineral oils with biological oils.
- Observe the maximum permissible hydraulic fluid pressure of 210 bars.
- Only couple clean hydraulic connectors.
- Slide the hydraulic connector(s) into the hydraulic sockets until they are heard to engage.
- Check the coupling points on the hydraulic hose lines, to see if they are sitting correctly and are sealed.

1. Swivel the actuation lever on the control valve on the tractor to float position (neutral position).
2. Clean the hydraulic plugs on the hydraulic hose lines before coupling the hydraulic hose lines with the tractor.
3. Connect the hydraulic hose line(s) to the tractor control unit(s).

5.4.2 Disconnecting hydraulic hose lines

1. Swivel the actuation lever on the control unit on the tractor to float position (neutral position).
2. Unlock the hydraulic connectors from the hydraulic sockets.
3. Protect the hydraulic plug and hydraulic socket against soiling using the dust protection caps.
4. Store the hydraulic hose lines in the hose cabinet.

5.5 Air pressure brake system

Keeping to the service interval is essential for proper functioning of the dual circuit service brake system.

Fig. 27/...

The access of the dual circuit air brake system requires a dual circuit air brake system on the tractor as well.

- Brake valve of the trailing vehicle with manually adjustable brake pressure regulator.
- Brake pressure regulator (Fig. 27/1) for manual adjustment of brake pressure. The setting of the braking power is done in 4 steps, depending on the load of the machine
    - Sprayer filled = 1/1
    - Sprayer partly filled = 1/2
    - Sprayer empty = 0
    - Towing operation = ⊠

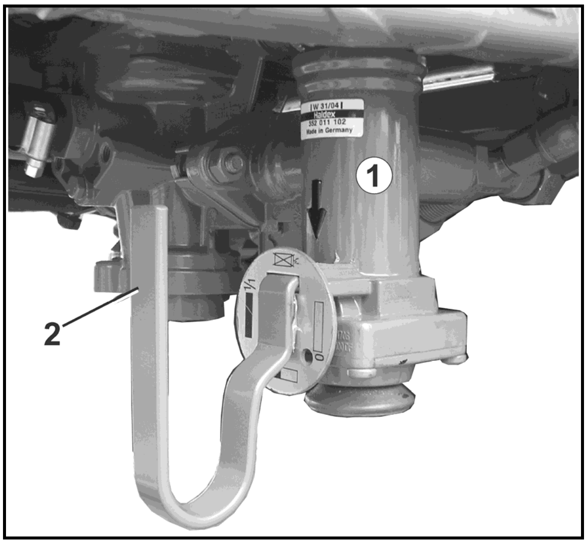


Fig. 27

Fig. 29/...

(1) Hose coupling on brake line (yellow)

(2) Hose coupling on supply line (red)

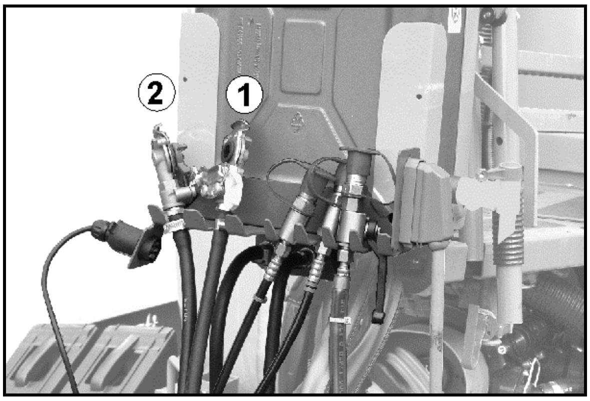


Fig. 28

Fig. 29/...

(1) Air reservoir

(2) Drainage valve for condensate.

(3) Test connection

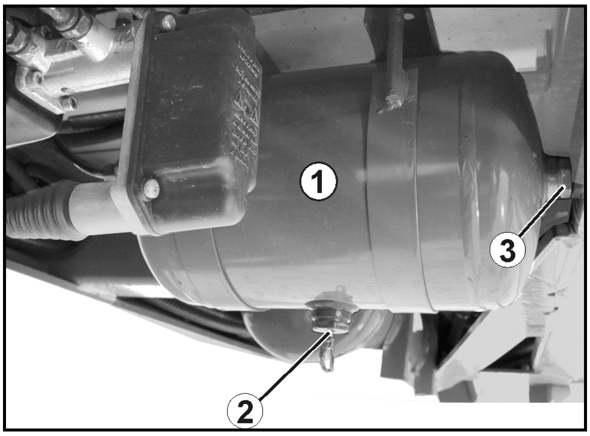


Fig. 29

5.5.1 Coupling the brake system

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through incorrectly functioning brake system.

- When coupling the brake and supply line, ensure that
    - the sealing rings on the hose couplings are clean.
    - the sealing rings on the hose couplings seal properly.
- Replace damaged sealing rings immediately.
- Drain the air reservoir before the first transport of the day.
- Only start up with the machine coupled if the pressure gauge on the tractor shows 5.0 bar.

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through from the accidentally rolling machine caused by unintentionally releasing the service brake.

Dual-circuit pneumatic braking system:

- Always couple the hose coupling on the brake line (yellow) first and then the hose coupling on the supply line (red).
- The service brake on the machine is immediately released from the brake setting if the red hose coupling is coupled.

1. Open the cover on the hose coupling on the tractor.
2. **Dual circuit** pneumatic braking system:

    2.1 Fasten the brake line hose coupling (yellow) in the yellow coupling on the tractor, as specified.

    2.3 Fasten the supply line hose coupling (red) in the red coupling on the tractor, as specified.

    → When coupling the supply line (red), the supply pressure coming from the tractor automatically presses out the actuator button for the release valve on the trailer brake valve

3. Loosen the parking brake and/or remove the wheel chocks.

5.5.2 Uncoupling the brake system

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through from the accidentally rolling machine caused by unintentionally releasing the service brake.

Dual-circuit pneumatic braking system:

- Always uncouple the supply line hose coupling (red) first, and then the brake line hose coupling (yellow).
- The service brake of the machine only moves into the brake position when the red hose coupling has been uncoupled.
- Always keep to this order, otherwise the service brake system will trip and may set the unbraked machine moving.

When the machine is uncoupled or pulled away from the trailer, air is vented from the trailer brake valve supply line. The trailer brake valve is automatically switched and operates the service braking system independently of the automatic, load-dependent braking force regulator.

1. Secure the machine against unintentionally rolling. To do this, use the parking brake and/or wheel chocks.
2. Pneumatic braking system

- **Dual circuit** pneumatic braking system:
  - 2.1 Release the supply line hose coupling (red).
  - 2.2 Release the brake line hose coupling (yellow).

3. Close the hose coupling covers on the tractor.

5.6 Hydraulic service brake system

To control the hydraulic service brake system, the tractor requires hydraulic braking equipment.

5.6.1 Coupling the hydraulic service brake system

❗ Only couple clean hydraulic couplings.

1. Remove the protective caps.
2. Clean the hydraulic plug and hydraulic socket if necessary.
3. Insert the tractor's hydraulic plug into the machine's hydraulic socket.
4. Tighten the hydraulic screw union (if present) hand-tight.

5.6.2 Uncoupling the hydraulic service brake system

1. Loosen the hydraulic screw union (if present).
2. Protect the hydraulic plug and hydraulic socket against soiling using the dust protection caps.
3. Store the hydraulic hose line in the hose cabinet.

5.6.3 Emergency brake

In event of the machine being released from the tractor during travel, the emergency brake will brake the machine.

Fig. 30/…

(1) Pulling cable

(2) Brake valve with pressure accumulator

(3) Hand pump to relieve the brake

(A) Brake released

(B) Brake applied

⚠ **DANGER**

Before travel, set the brake to the application position.

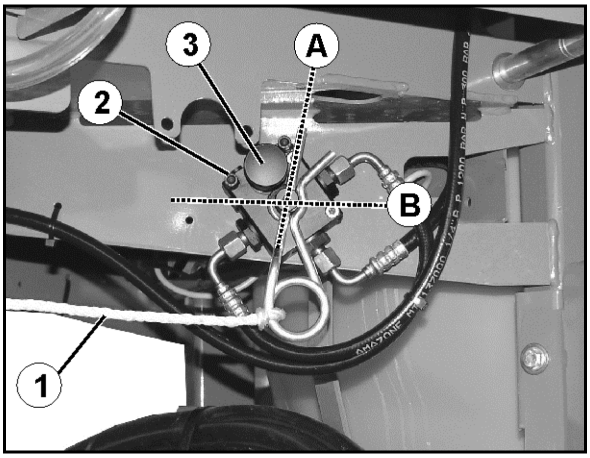


Fig. 30

For this purpose:

1. Secure the pulling cable to a fixed point on the tractor.
2. Apply the tractor brake with the tractor engine running and hydraulic brake connected.

→ Pressure accumulator of the emergency brake is being charged.

DANGER

Risk of accident through brake malfunction!
After withdrawing the safety splint (e.g. when activating the emergency brake), it is essential to insert the safety splint into the brake valve from the same side (Fig. 30). Otherwise the brake will not function.

After reinserting the safety splint, carry out a brake test for the service brake and the emergency brake.

When the implement is uncoupled, the pressure accumulator presses hydraulic oil:

- into the brake and decelerates the implement,

or

- into the hose line to the tractor and impedes the coupling of the brake line to the tractor.

In these cases, relieve pressure using the hand pump on the brake valve.

5.7 Parking brake

When the parking brake is on, it secures the uncoupled machine against unintentional rolling. The parking brake is operated by turning the crank, which in turn operates the spindle and bowden cable.

- Crank; locked in idle position

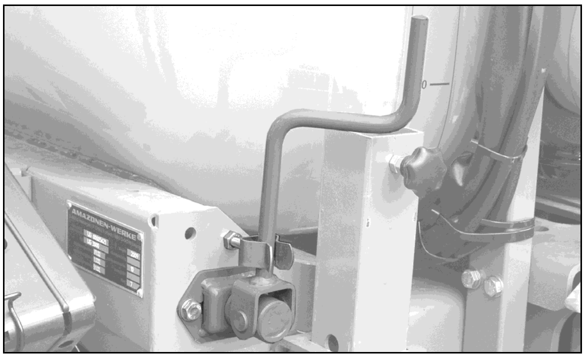


Fig. 31

- Crank position for releasing / applying in the end area.

  (the parking brake requires approx. 20 kg manual force to be applied).

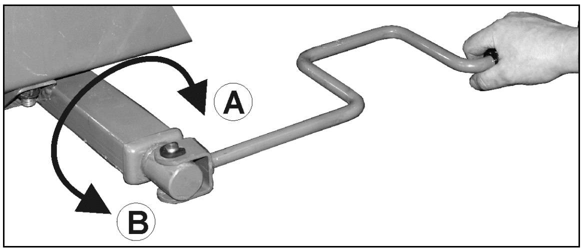


Fig. 32

- Crank position for quick releasing / applying.

  (A) Apply the tractor parking brake.

  (B) Release parking brake.

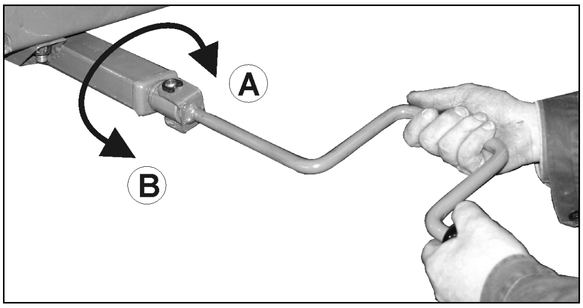


Fig. 33

- Correct the setting of the parking brake if the spindle's tension is no longer sufficient.
- Ensure that the bowden cable is not lying or rubbing against other vehicle parts.
- When the parking brake is off, the bowden cable must be slightly slack.

5.8 Foldable wheel chocks

Each of the wheel chocks is attached with a thumb bolt in the front storage compartment under the tractor cab.

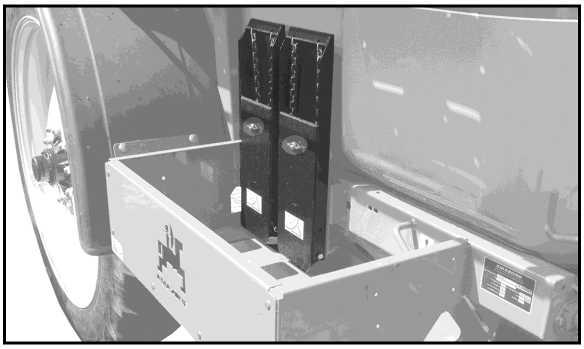


Fig. 34

Put the foldable wheel chocks into operating position by pressing the button and apply directly on the wheels before uncoupling.

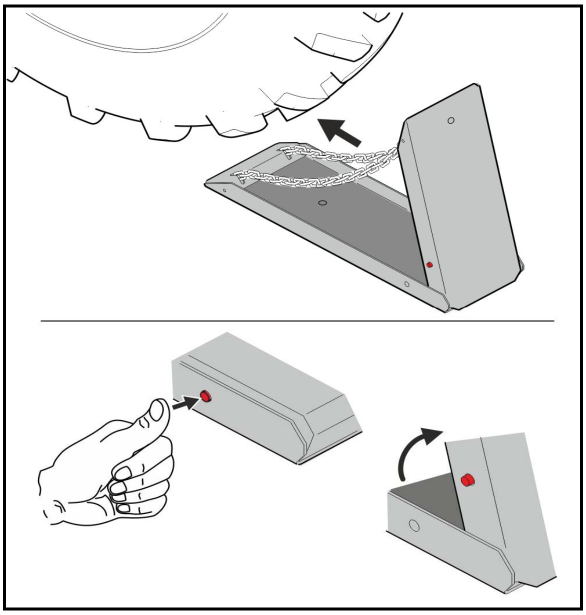


Fig. 35

5.9 Safety chain for implements without brake system

Implements without a brake system or with a single-line brake system must be equipped with a safety chain in compliance with local country regulations.

The safety chain must be correctly fixed to a suitable position on the tractor before transporting.

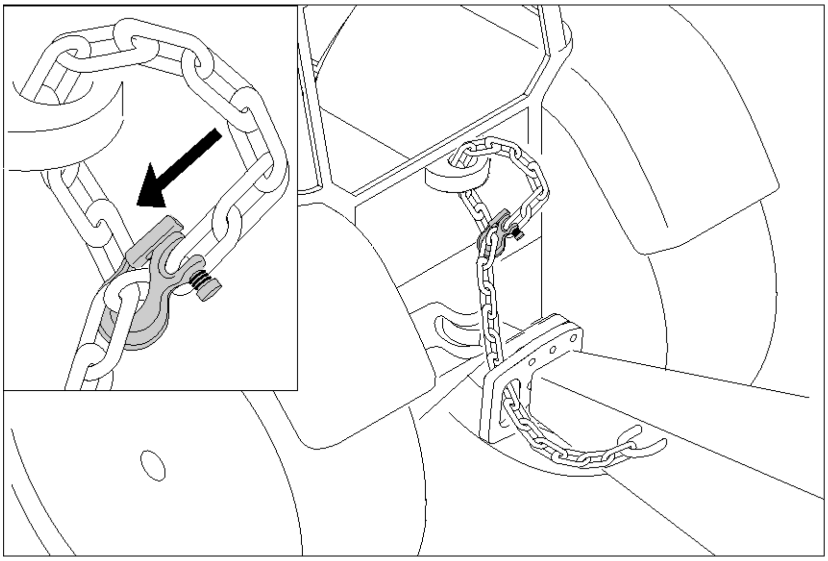


Fig. 36

5.10 Drawbars

DANGER

Risk of accident from the machine tipping over.

- For transportation, move the steering drawbar/steering axle to the transport position.
- Transportation while AutoTrail is switched on is prohibited.

For the track follow drawbar and universal drawbar, on first use and, if applicable, in event of a change of tractor type, adjust the steering geometry of the drawbar to the tractor.

If using automatic trailer couplings, check that the connection is secure after coupling. If using non-automatic trailer couplings, secure the coupling pin positively after inserting it.

5.10.1 Track follow drawbar SelfTrail

The track follow drawbar is secured to the lower Category II coupling points of the tractor's hydraulic system.

The **track follow drawbar** (Fig. 37/1) ensures the exact track follow-up of the sprayer behind the tractor.

The steering geometry is adjusted to the tractor via the longitudinal adjustment of the drawbar. see page 140.

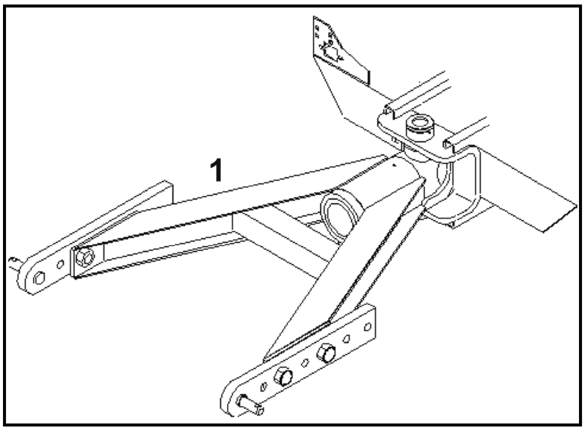


Fig. 37

5.10.2 Universal drawbar UniTrail

The universal drawbar is secured to the lower Category II coupling points of the tractor's hydraulic system.

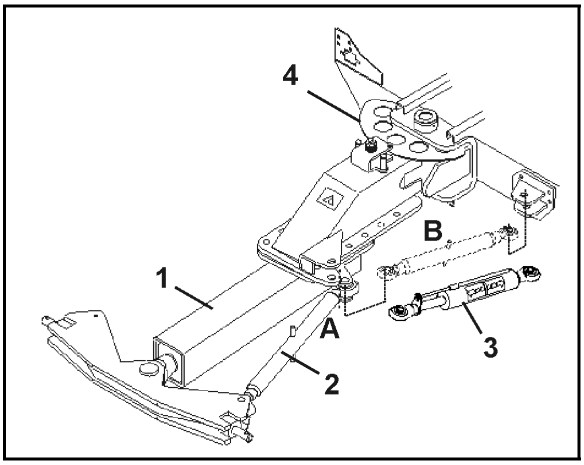


Fig. 38

Fig. 38/…

(1) Universal drawbar

(2) Fixing bar (standard equipment)

alternatively

(3) Hydraulic cylinder for hydraulic drawbar control via tractor control unit (optional)

(4) Brake to prevent increased shaking of the machine.

The universal drawbar ensures precise tracking of the machine behind the tractor.

The universal drawbar can be used

- with track-follow effect:

  Fixing bar / hydraulic cylinder in position **A**

→ During use on the field.

- without track-follow effect:

  Fixing bar / hydraulic cylinder in position **B**

→ During transport (road travel)

WARNING

Risk of accident from unstable driving behaviour!

Secure the fixing bar / hydraulic cylinder in the transport position before transportation.

The steering geometry is adapted to the tractor by adjusting the drawbar length - see page 140.

5.10.3 Straight and hitch drawbars

Fig. 39: Hitch drawbar

The hitch drawbar is fastened in the tractor hitch hook.

Fig. 40: Straight drawbar

The straight drawbar is fastened in the tractor pin coupling.

Fig. 39, Fig. 40/…

(1) Fixing bar

(2) Hydraulic cylinder (optional)

The straight and hitch drawbars can be used as

- fixed drawbar with fixing bar
- steering drawbar
    - with AutoTrail control for precise tracking with hydraulic cylinder.
    - with control via the tractor control unit for travel on gradients.

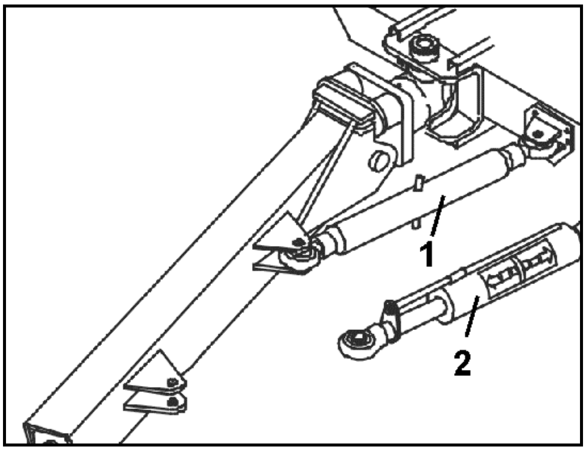


Fig. 39

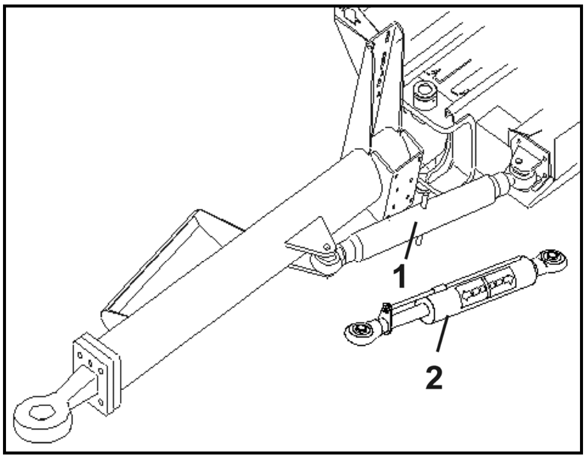


Fig. 40

5.11 Lower link safety chain

The safety chain prevents unintentional raising of the lower link if there is a negative drawbar load.

This can prevent damage to the universal joint shaft.

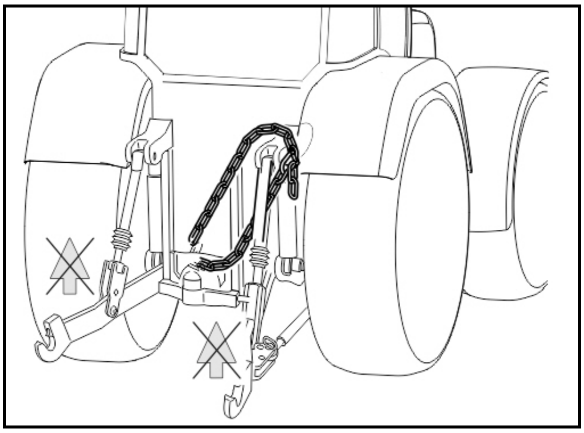


Fig. 41

5.12 AutoTrail tracking control

AutoTrail tracking control for automatic, virtually 100% precise tracking captures the position of the angle of the drawbar (Fig. 42/1) to determine the direction of travel of the tractor.

If the position of the drawbar deviates from the tractor's central position (drawbar lined up with tractor's direction of travel), AutoTrail realignsthe tracking steering drawbar until the central position is reached again.

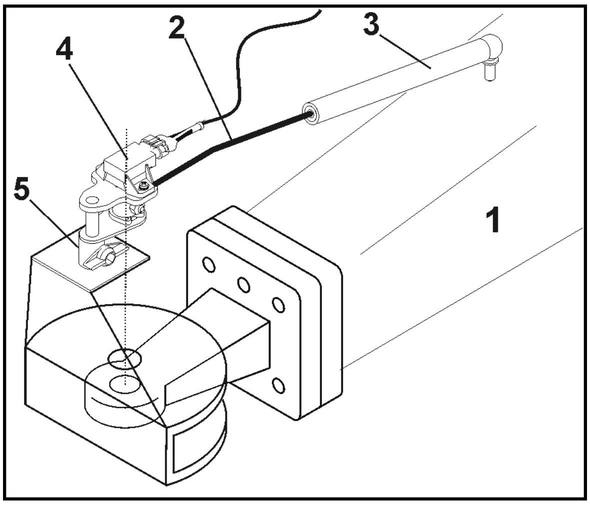


Fig. 42

Connecting the AutoTrail position encoder

1. Insert the rod (Fig. 42/2) into the plastic bush (Fig. 42/3) stecken.
2. Insert the position encoder (Fig. 42/4) into the holder (Fig. 42/5).
3. Align the potentiometer in direction of travel (cable to rear) and secure with a locking screw against rotation.

See operating manual for software ISOBUS.

A precondition for the perfect functioning of the hydraulically operated following steering axle/drawbar is a correctly performed AutoTrail calibration

Perform a AutoTrail calibration

- before initial operation.
- if there are any deviations between the following steering axle control shown on the display and the actual following steering axle control.

Safety functions for preventing the machine from tipping over when the AutoTrail is switched on.

Safety functions.

- If the sprayer boom is raised higher than 1.5 m:
- If the boom is folded in transport position:

→ AutoTrail is switched off (once the drawbar is in its central position).

- If an operational speed greater than 20 km/h is reached::

→ AutoTrail axle / drawbar moves automatically to the central position and remains in on-road mode.

DANGER

The use of the AutoTrail steering drawbar

- **for precise tracking on sloping terrain is prohibited.**

  Only use the AutoTrail steering drawbar on level ground. Unevenness of a maximum 5° (due to furrows) is permitted.
- **for manoeuvring while reversing is prohibited.**

Risk of the machine tipping over.

- **When using the tracking steering drawbar, there is a risk of tipping over when performing a turning manoeuvre on a headland, and on tight bends at high speeds, due to the shifting of the centre of gravity when the steering drawbar is pushed in.**
- **The risk of tipping over is especially great when travelling downhill on uneven ground.**
- **Adapt your driving accordingly and reduce speed when performing a turning manoeuvre on a headland, so that you are in complete control of the tractor and trailed sprayer.**

To prevent the sprayer from tipping over, observe the following general principles:

- Avoid sudden, sharp turns.
- Reduce speed before turning.
- While turning, do not brake suddenly if still steering.
- Exercise extreme caution when steering in furrows.

5.12.1 AutoTrail steering drawbar

Fig. 43/...

(1) Steering drawbar

(2) Control cylinder

(3) Stop tap for locking the hydraulic cylinder during transportation

  (0) → operation locked

  (I) → operation unlocked

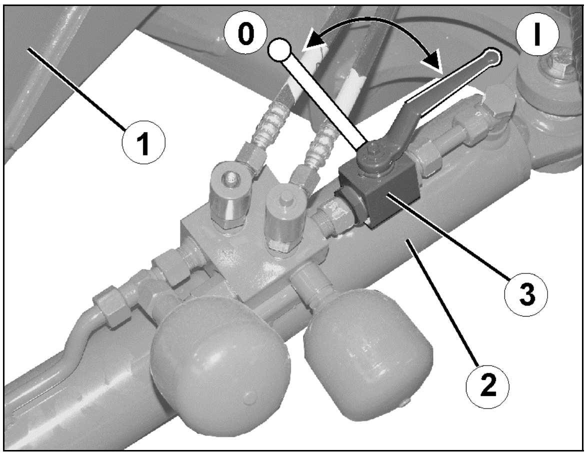


Fig. 43

Transportation

DANGER

Risk of accident from the machine tipping over.

- For transportation, move the steering drawbar to the transport position.
- Transportation while AutoTrail is switched on is prohibited.

On the control terminal, for this purpose:

1. Set the steering drawbar to central position (drawbar flush with machine).

   On the control terminal, for this purpose

   1.1 ✋ Put AutoTrail into manual mode.

   1.2 , Align steering drawbar / steering axle manually.

→ AutoTrail stops automatically once the central position has been reached.

2. Switch off control terminal.
3. Actuate tractor control unit *red* betätigen.

→ Switch off oil circulation.

4. Secure steering drawbar by closing the stop tap in position **0**.

5.13 Tracking control via tractor control unit

When working on sloping terrain (sprayer slips off),

- the **tractor control unit** *blue*

can be used from the comfort of the tractor seat to manually steer the steering drawbar so that it is tracking precisely.

When steering manually, hydraulic control reduces damage to the crop, particularly with regard to drill crops (e.g. potatoes or vegetables) when driving or manoeuvring in and out of the drills.

Turning circle d_{wk} > 18 m.

Transportation

DANGER

Risk of accident from the machine tipping over.

Move the steering drawbar to the transport position for transportation.

1. Actuate tractor control unit *blue* until the drawbar is at the zero setting (Fig. 44/1).

Pay attention to the pointer and scale on the hydraulic cylinder.

2. Universal drawbar: Secure the hydraulic cylinder in position A, see page 76.

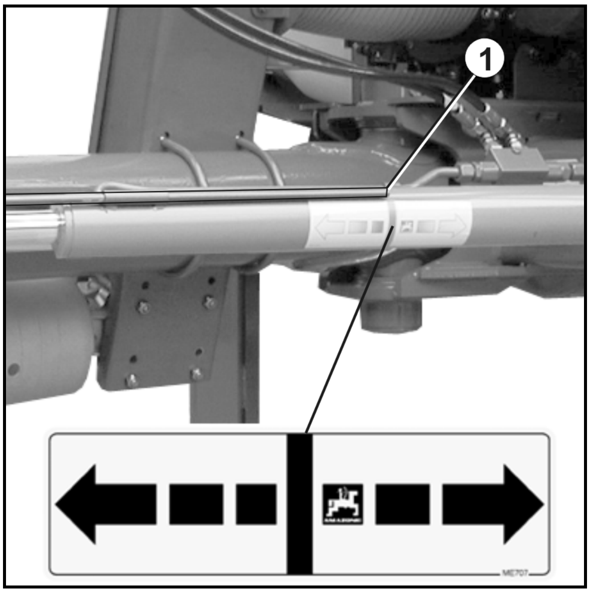


Fig. 44

5.14 Stand

- Raise the stand after coupling to the tractor.
- Before uncoupling the machine from the tractor, lower the stand.

Stand with crank (Fig. 46/1):

1. Loosen linchpin (Fig. 45/2).
2. Pull out pin (Fig. 45/3).
3. Raise/lower stand using handle (Fig. 45/4).
4. Reinsert the pin into the stand and secure with the linchpin.
5. Using the manual crank (Fig. 46/5)
   - continue to lower the stand until the coupling point is relieved
   - completely raise the stand.

Stand adjustable (Fig. 45 /1) :

1. Loosen linchpin (Fig. 46/2) lösen.
2. Pull out pin (Fig. 46/3) herausziehen.
3. Raise/lower stand using handle (Fig. 46/4).
4. Reinsert the pin into the stand and secure with the linchpin.

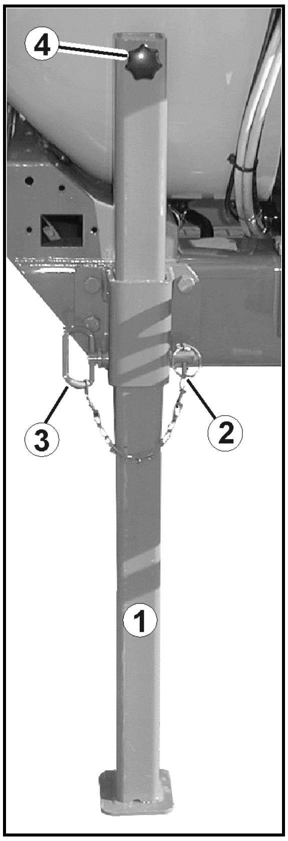


Fig. 45

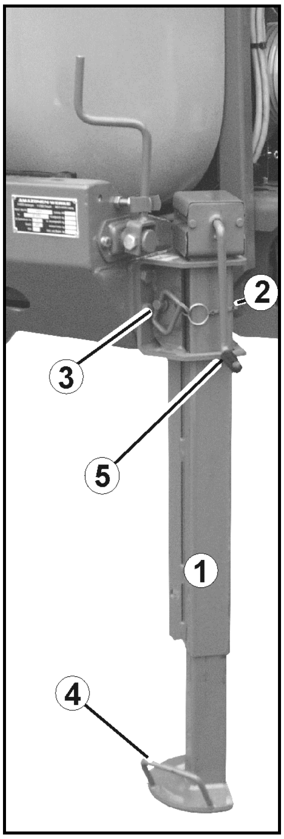


Fig. 46

5.15 Spray liquid tank

The spray liquid tank is filled via

- the filling opening,
- the suction hose (optional) on the suction port,
- the pressure filling connection (optional)

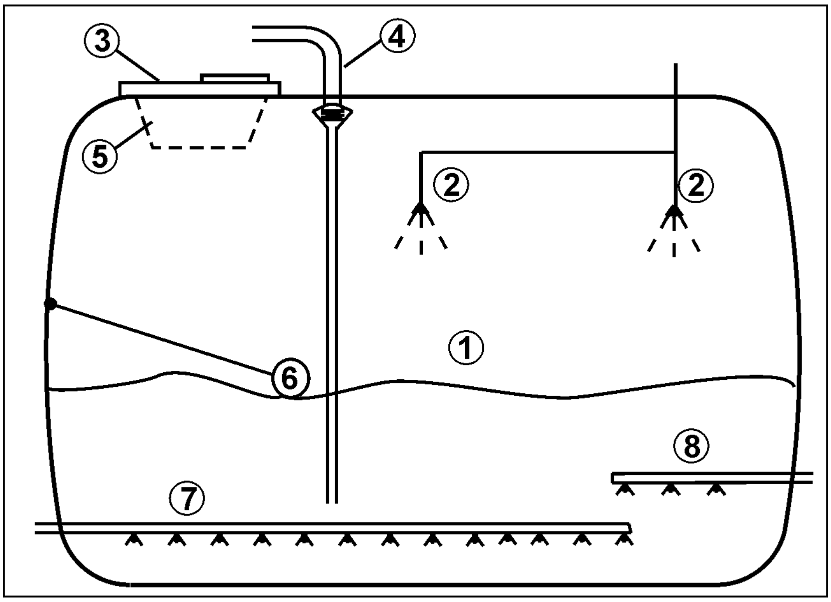


Fig. 47

(1) Spray liquid tank
(2) Internal cleaning
(3) Hinged/screw lid for filling opening
(4) External filling connection
(5) Filling sieve
(6) Float for determining the fill level
(7) Agitator
(8) Additional agitator (only UG Super)

WARNING

Damage to the lid and escaping spray agent when driving.

The filling sieve made of stainless steel as a surge protection must always be mounted.

Hinged/screw lid for the filling opening

- To open the lid, rotate to the left and swing open.
- To close the lid, fold down and rotate to the right until tight.

5.15.1 Fill level indicator on the machine

The fill level indicator shows the tank capacity [l] in the spray liquid tank

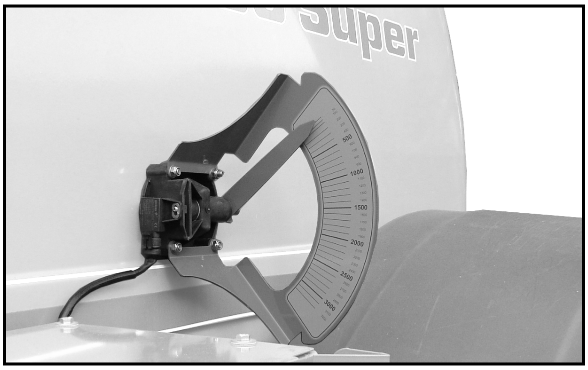


Fig. 48

5.15.2 Agitator

UG Super:

UG Super has a main agitator and an additional agitator.

The main agitator has its own agitator pump.

UG Super /Special:

The additional agitator is supplied by the operation pump.

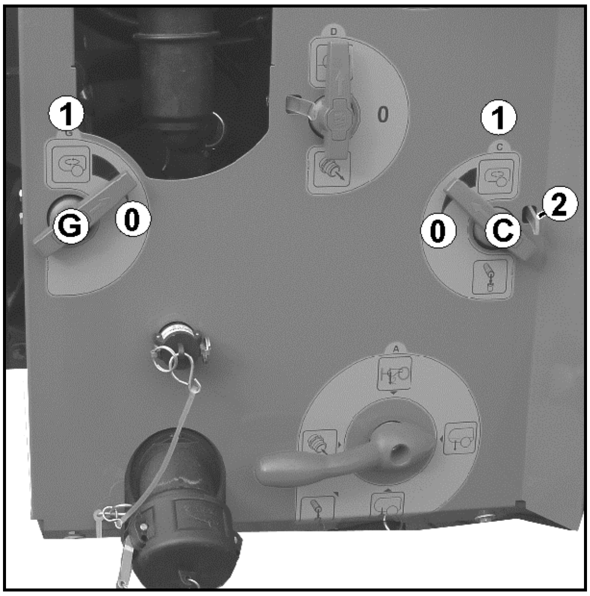


Fig. 49

Both agitators are designed as hydraulic agitators. The additional agitator is also combined with pressure filter rinsing for the self cleaning pressure filter.

When the agitators are switched on, they mix the spray liquid in the spray liquid tank, thereby providing a homogeneous spray liquid. The stirring performance can be infinitely adjusted.

The stirring performance is adjusted

- using switch tap **G** for the main agitator on the setting tap.
- using switch tap **C** for the additional agitator on the setting tap.

To switch off the relevant agitator, turn the setting tap to position **0**.

The fastest stirring performance is available in position **1**.

Safety device for drainage function on the pressure filter (Fig. 49/2).

❗	When stirring the spray liquid, follow the instructions of the spraying agent manufacturer!

5.15.3 Maintenance platform with ladder

Maintenance platform with swivel-down ladder for reaching the filling dome.

DANGER

- **Never climb into the spray liquid tank.**

→ Risk of injury from poisonous vapours.

- **It is strictly forbidden to ride on the field sprayer.**

→ Riding on the machine creates a risk of falling.

It is essential to ensure that the ladder is locked in the transport position.

Fig. 50/...

(1) Folded up ladder secured in transport position.

(2) Automatic catch

→ To unlock, turn the lever up

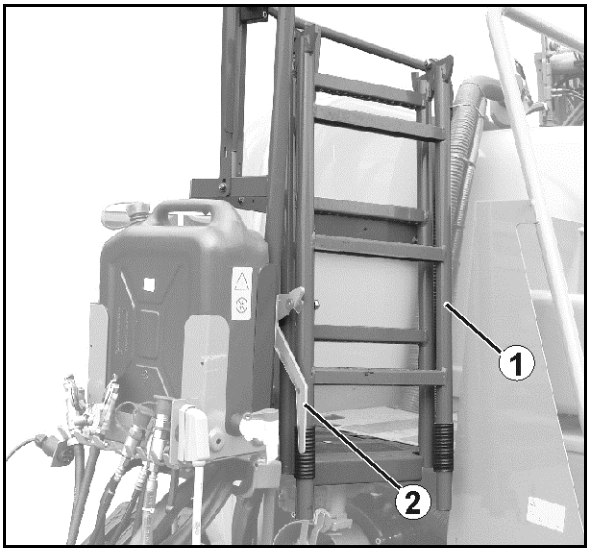


Fig. 50

5.15.4 Suction port for filling the spray liquid tank (optional)

Please observe the relevant instructions when filling the spray liquid tank via the suction hose from public water points (please page 152).

Fig. 51/...

(1) Suction hose (8 m, 3“) in transport position.

(2) Quick coupling.

(3) Suction filter for filtering the intake water.

(4) Non-return valve. Prevents liquid already in the spray liquid tank from running out if the vacuum suddenly collapses during the filling process.

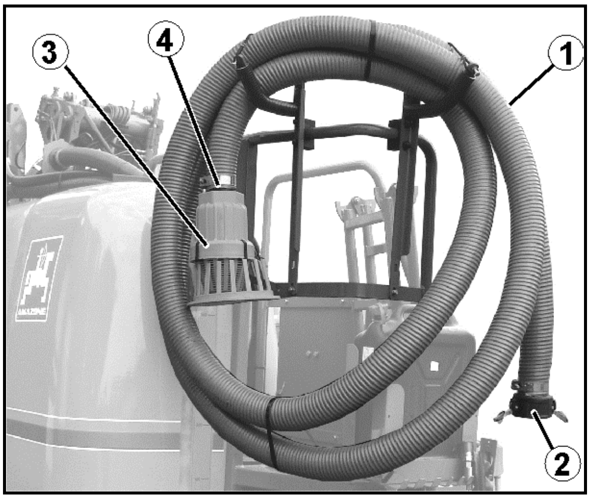


Fig. 51

5.15.5 Filling connection for filling the spray liquid tank with pressure (option)

- Filling connection with free flow path and swivel spout (Fig. 52).
- Return flow safe direct filling.

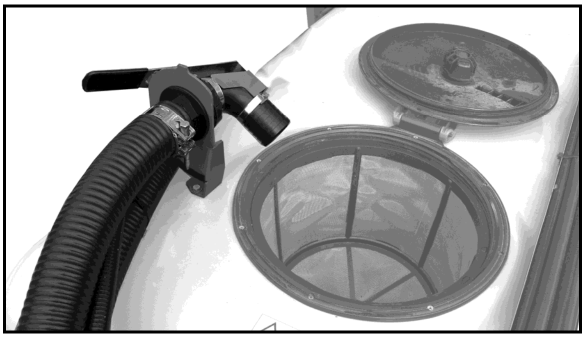


Fig. 52

- Filling connection switch tap (Fig. 53).

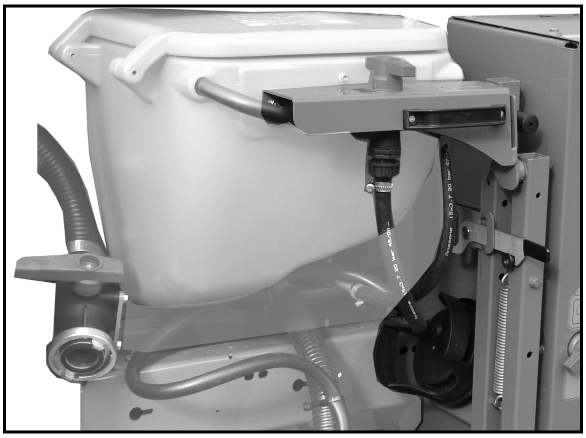


Fig. 53

5.16 Flushing water tank

Clear water is carried In the flushing water tank. The water serves to

- thin the residue in the spray liquid tank at the end of spraying operation.
- clean (flush) the whole field sprayer in the field.
- clean the suction chest and the spray lines when the tank is full.

- **Only fill the flushing water tank with clear fresh water**.
    - UG 2200
      Tank volume: 280 litres.
    - UG 3000
      Tank volume: 420 litres.

Fig. 54/...

(1) Flushing water tank

(2) Filling opening with screw lid and venting valve

Fig. 55/…

(1) Fill level indicator in litres

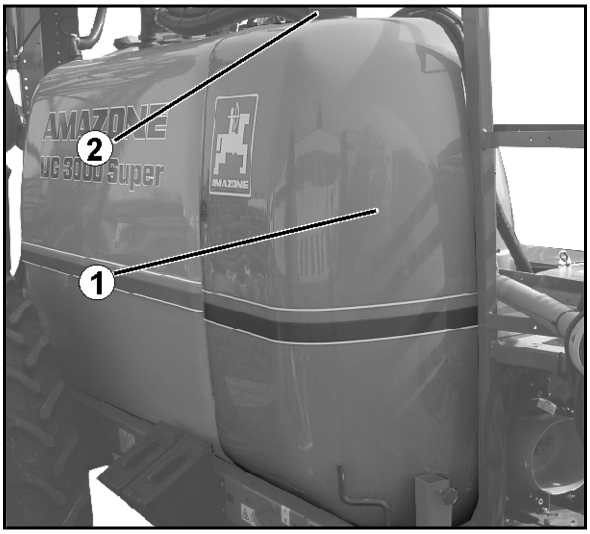


Fig. 54

Filling the flushing water tanks

1. Remove the cover from the flushing water tank.
2. Fill the flushing water tank via
    - the filling connection.
    - the tank opening
3. Screw on the lid.

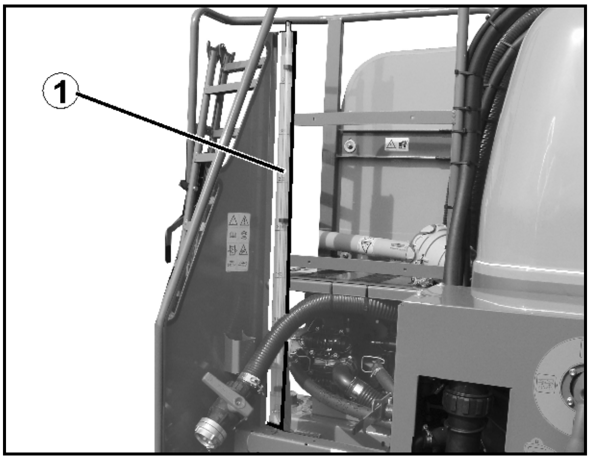


Fig. 55

5.17 Induction bowl with canister flushing

Fig. 56/...

(1) Swivel-out induction bowl for receiving, dissolving and drawing in crop protection agents and urea.

(2) Hinged lid.

(3) Handle for swivelling the induction bowl.

(4) Spray gun

(5) Hinged lid catch.

(E) Switch tap for ring line / canister flushing.

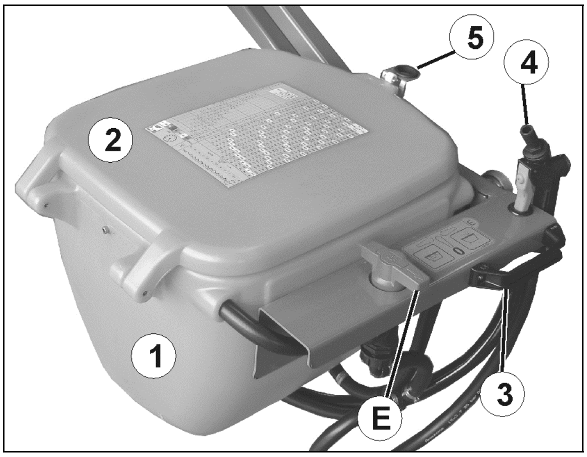


Fig. 56

Fig. 57/…

Induction bowl with transport safety catch for preventing the induction bowl from being swivelled down while in transport position

To swivel the induction bowl in filling position:

1. Take hold of the handle on the induction bowl.
2. Unlock transport safety catch (Fig. 57/1) entriegeln.
3. Swivel the induction bowl down.

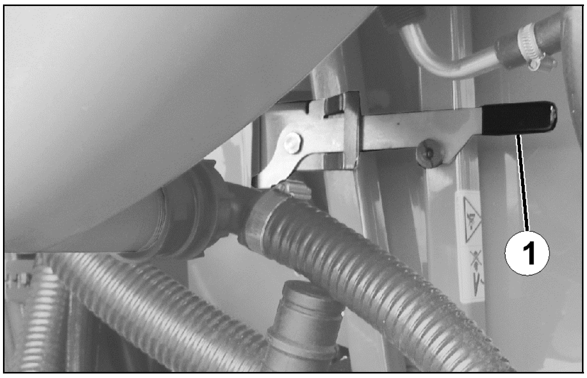


Fig. 57

Fig. 58/...

(1) Rotating canister flushing nozzle for washing out canisters or other containers.

(2) Pressure plate.

(3) Ring line to dissolve and induct crop protection agent and urea.

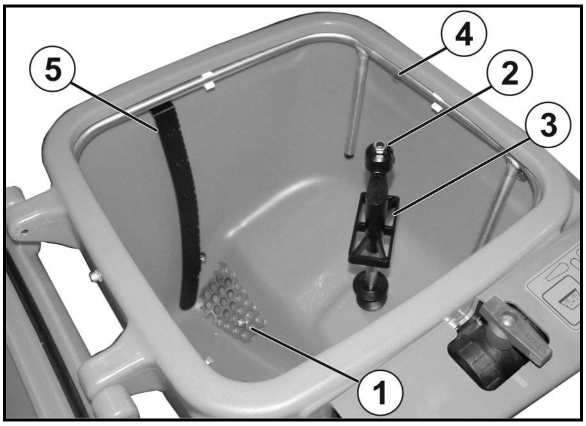


Fig. 58

Water escapes from the canister flushing nozzle if

- the pressure plate is pressed downwards
- the closed folding cover is pressed downwards (Fig. 59).

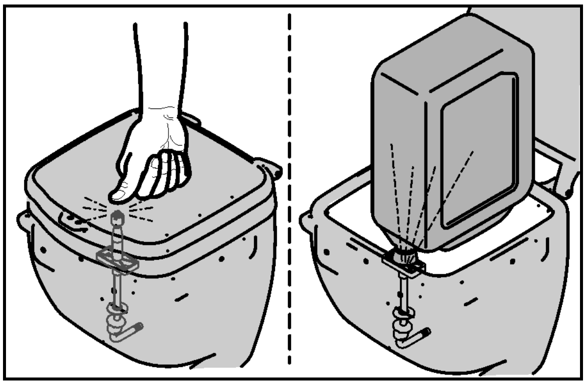


Fig. 59

WARNING

Close the induction bowl before rinsing out.

Spray gun for flushing the induction bowl

The spray gun is used for flushing the induction bowl with flushing water during or after the flushing process.

Secure the spray gun against unintentional spraying using the locking mechanism (**Fig. 60**/1)

- before each pause in spraying.
- before depositing the spray gun in its holder after cleaning work is complete.

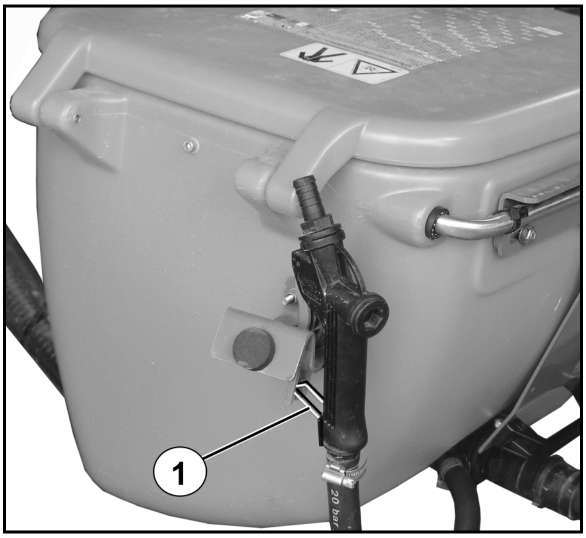


Fig. 60

5.18 Spray agent addition Ecofill (option)

Ecofill-connection for extracting spraying agent from Ecofill-tanks.

Fig. 61/…

(1) Ecofill filling connection (optional).

(2) Flushing port for Ecofill-counter.

(3) Ecofill switch tap.

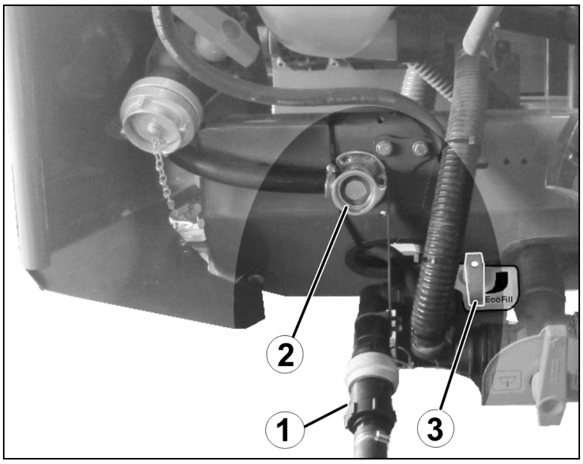


Fig. 61

5.19 Fresh water tank

Fig. 62/…

(1) Fresh water tank capacity: 20l)

(2) Drain tap for clear fresh water

- for cleaning hands
- for cleaning the spraying nozzles.

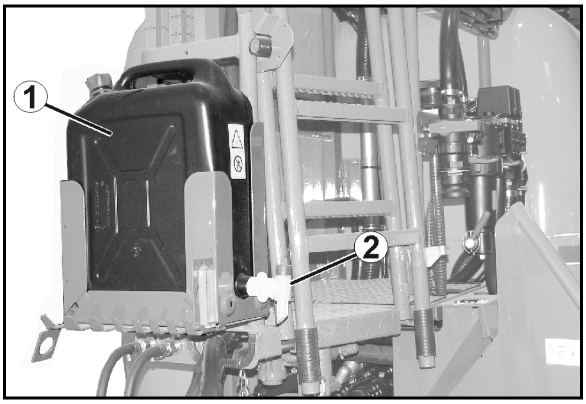


Fig. 62

Only fill the fresh water tank with clear fresh water.

WARNING

Danger of poisoning from using unclean water in the fresh water tank.

Never use the water from the fresh water tank as drinking water. The materials used to construct the fresh water tank are not food-safe.

5.20 Pump equipment

Pump equipment 250 l/min

- Single pump as operation pump and agitator pump.

Pump equipment 370 l/min

- Operation pump with 210 l/min
- Agitator pump with 160 l/min

Never exceed the maximum permissible pump drive speed.

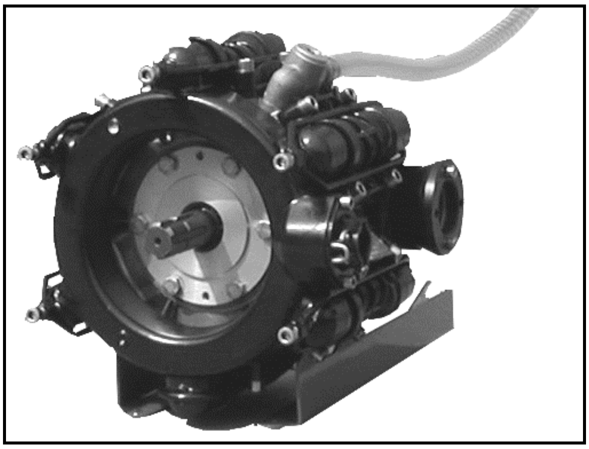


Fig. 63

Pump equipment			**250 l/min**	**370 l/min [210l/min + 160 l/min]**	
Pumptype			BP280	BP235	BP171
Delivery quantity at 540 rpm	[l/min]	2 bar 20bar	250 240	208 202	160 154
Power requirement	[kw]		9,8	8,4	7,0
Construction type			6- cyl piston-operated diaphragm oump	6- cyl	4- cyl
Pulsation damping			Oil damping	Oil damping	Pressure reservoir
Residue					
• Pump	[l]		1,9	1,7	1,6
• Suction hose			1,5	0,9	0,9
• Pressure hose			0,8	0,8	0,8
• Pump equipment tot			4,2	3,4	3,3

5.21 Filter equipment

- Use all the filters provided with the filter equipment. Clean the filters regularly (refer to the "Cleaning" section, page 188). Fault-free field sprayer operation can only be achieved by correct filtering of the spray liquid. Correct filtering has a significant effect on the success of the crop protection measures.
- Pay attention to the permissible combinations of filters and mesh sizes. The mesh sizes for the self cleaning pressure filter and the nozzle filters must always be smaller than the nozzle opening of the nozzles in question.
- Ensure that the use of pressure filter inserts with 80 or 100 mesh/inch for some crop protection agents can filter out active agents. In individual cases, enquire with crop protection agent manufacturers.

5.21.1 Filling sieve

The filling sieve (Fig. 64/1) prevents the spray liquid from being contaminated when the spray liquid tank is being filled via the filling dome.

Mesh size: 1.00 mm

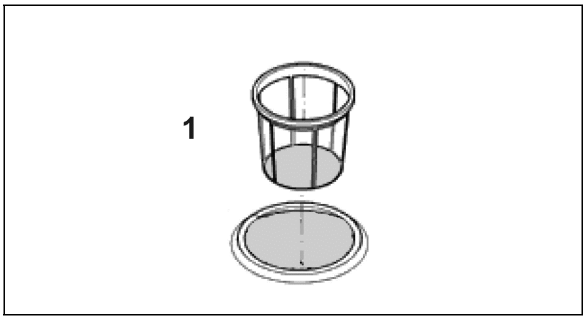


Fig. 64

5.21.2 Suction filter

The suction filter (Fig. 65/1) filters

- the spray liquid during the spraying operation.
- the water when filling the spray liquid tank via the suction hose.

Mesh size: 0.60 mm

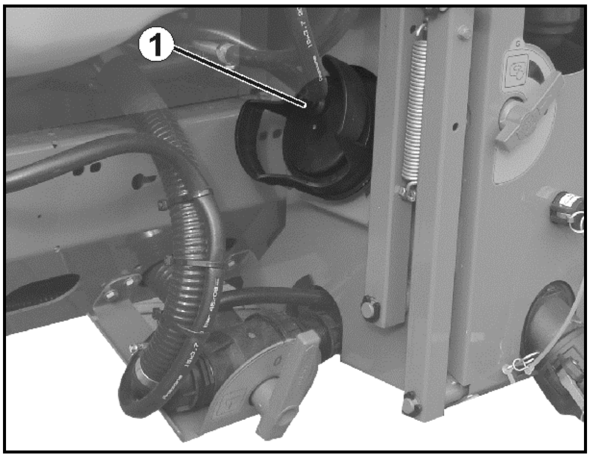


Fig. 65

5.21.3 Self cleaning pressure filter

The self cleaning pressure filter (Fig. 66/1)

- prevents the nozzle filter upstream of the spraying nozzle from becoming blocked.
- has a greater mesh count/inch than the suction filter.

With the additional agitator switched on, the inside surface of the pressure filter insert is constantly rinsed through, and undissolved particles of spraying agent and dirt are conveyed back into the spray liquid tank.

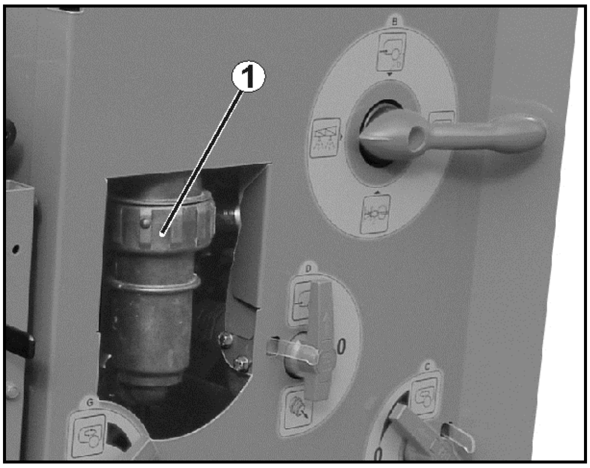


Fig. 66

Overview of the pressure filter inserts

- 50 mesh/inch (standard), blue
  for nozzle size '03' and larger
  Filter area: 216 mm²
  Mesh size: 0.35 mm
- 80 mesh/inch, yellow
  for nozzle size '02'
  Filter area: 216 mm²
  Mesh size: 0.20 mm
- 100 mesh/inch, green
  for nozzle size '015' and smaller
  Filter area: 216 mm²
  Mesh size: 0.15 mm

5.21.4 Nozzle filters

The nozzle filters (Fig. 67/1) prevent the spraying nozzle from becoming blocked.

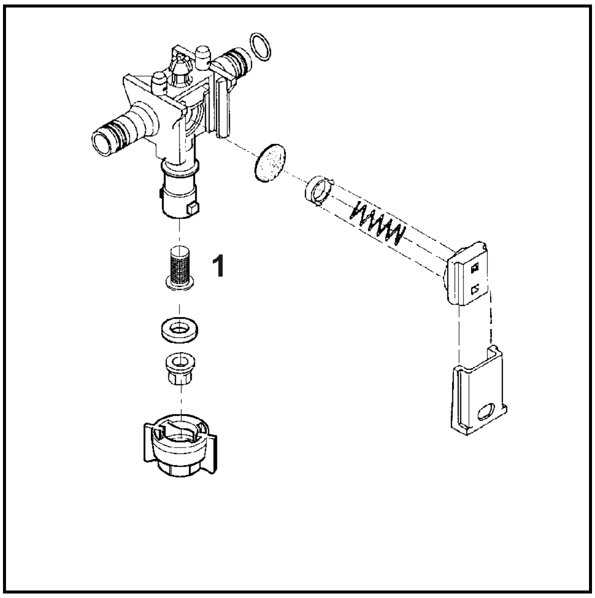


Fig. 67

Overview of the nozzle filters

- 24 mesh/inch,
  for nozzle size '06' and larger
  Filter area: 5.00 mm²
  Mesh size: 0.50 mm
- 50 mesh/inch (standard),
  for nozzle size '02' to '05'
  Filter area: 5.07 mm²
  Mesh size: 0.35 mm
- 100 mesh/inch,
  for nozzle size '015' and smaller
  Filter area: 5.07 mm²
  Mesh size: 0.15 mm

5.21.5 Bottom sieve in the induction bowl

The bottom sieve (Fig. 68/1) in the induction bowl prevents lumps and foreign bodies from being drawn in.

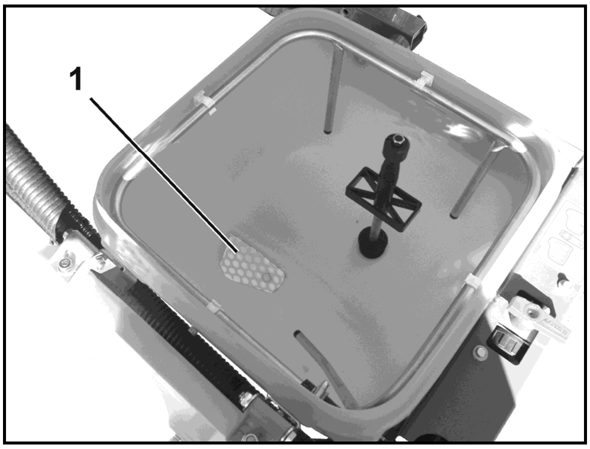


Fig. 68

5.22 Transport and secure container (optional)

Transport and secure container (Fig. 69/1) for storing protective clothing and accessories.

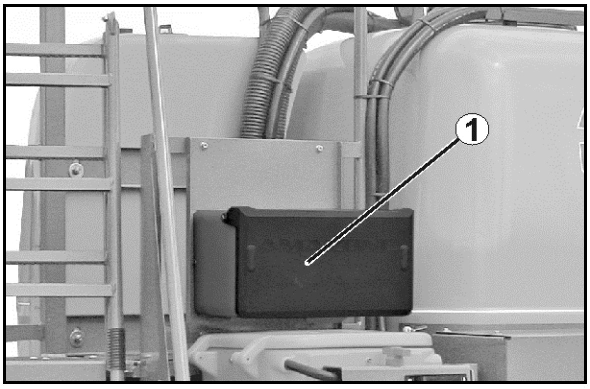


Fig. 69

5.23 Camera system (option)

The implement can be equipped with (Fig. 70/1) a camera.

Features:

- Viewing angle of 135°
- Heater and lotus coating
- Infrared night-view technology
- Automatic backlight compensation

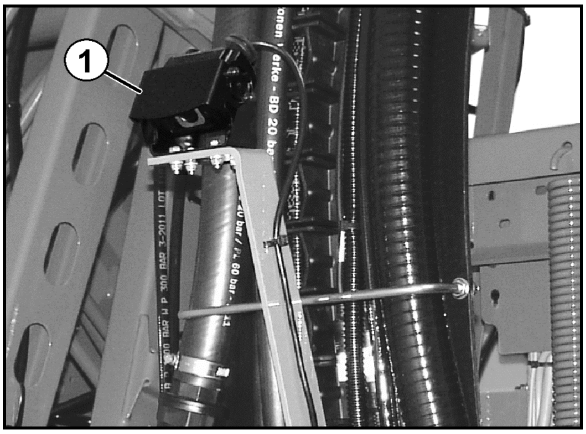


Fig. 70

5.24 Exterior wash down kit (optional)

Fig. 71/…

Exterior wash down kit for cleaning the field sprayer, includes

(1) Hose coiler,
(2) 20 m pressure hose,
(3) Spray gun

Operating pressure: 10 bar

Water output: 18 l/min

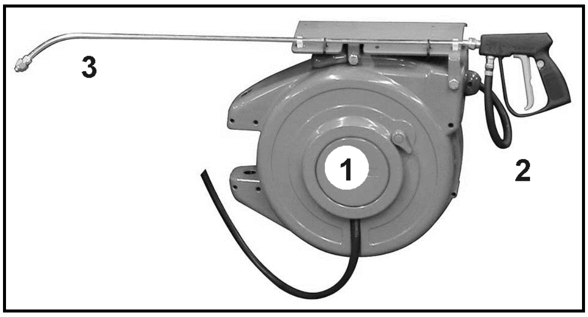


Fig. 71

WARNING

Danger from liquids escaping under pressure and contamination with spray liquid if the spray gun is activated accidentally.

Secure the spray gun against unintentional spraying using the locking mechanism (Fig. 72/1)

- before each pause in spraying.
- before depositing the spray gun in its holder after cleaning work is complete.

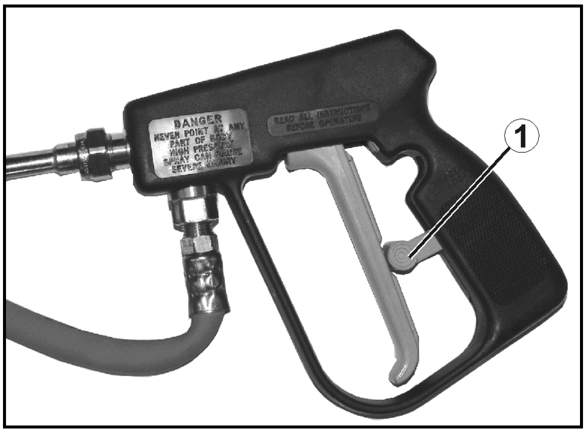


Fig. 72

5.25 Work lights

Separate power supply from the tractor is required.

Work floodlights:

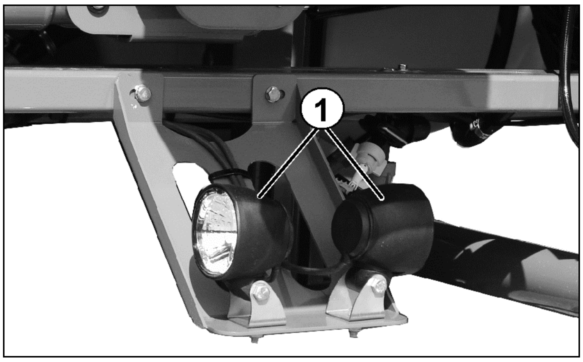


Fig. 73

LED- individual nozzle illumination::

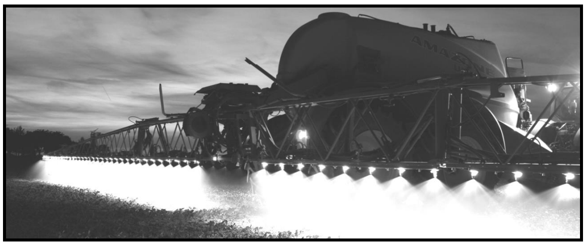


Fig. 74

5.26 Operating terminal

UG field sprayers with AMATRON 3 or AMASPRAY$^+$ have quantity regulation.

- The spread rate is set on the operating terminal.

5.26.1 Control terminal

The following are performed via the control terminal:

- input of implement-specific data.
- input of job-related data.
- control of the field sprayer to change the spray rate used in spraying operation.
- the operation of all functions on the sprayer boom.
- the operation of special functions.
- the monitoring of the field sprayer during spraying operation.

The control terminal controls a job computer. Here, the job computer receives all necessary information and manages the area-based regulation of the spray rate [l/ha] depending on the quantity (target quantity) entered and the current operational speed [km/h].

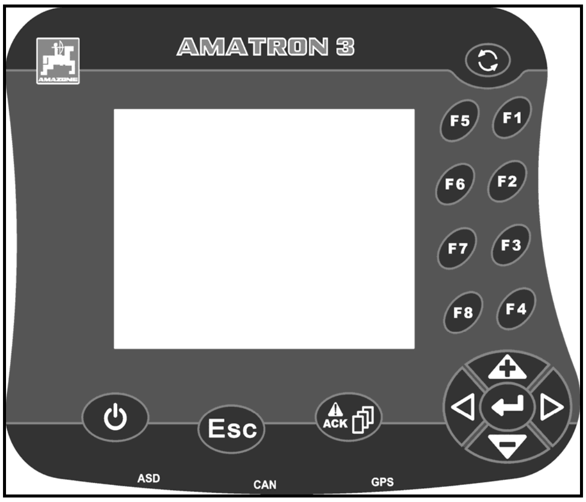


Fig. 75

See operating manual for software ISOBUS.

5.27 AMASPRAY$^+$

The AMASPRAY$^+$ can be used on the field sprayer as a fully automatic control device. The device carries out area-based regulation of the spread rate, depending on the current speed and working width.

Current spread rate, speed, worked area, total area, quantity applied and overall spread rate, working time and distance travelled are continuously detected.

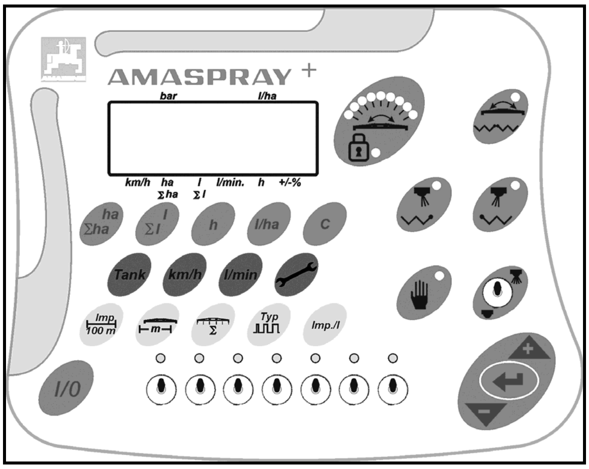


Fig. 76

See also the AMASPRAY$^+$ operating manual.

5.28 Comfort equipment (optional)

Comfort equipment for implements with control terminal.

Comfort equipment functions:

- **Cleaning – remote-controlled residue dilution and internal cleaning**
  - o Remote-controlled switching of the intake cock from spraying to flushing.
  - o Automatic agitator cutout during flushing.
  - o Remote-controlled switching on and off of internal cleaning.
- **Filling stop when filling via suction port**
  - o Filling stopped automatically when the desired fill level is reached (signal limit).
  - o Filling stopped manually.

  →Remote-controlled switching of intake cock from filling to spraying.

The intake cock is operated:

- by remote control via the control terminal and electric motor.

  For remote control, the hand lever must be engaged with the cylinder screw (2) in the hole of the slewing ring (3).
- manually at the control terminal.

  For manual operation
  - o swivel the hand lever (1) to guide the cylinder screw (2) out of the slewing ring
  - o turn the hand lever to the desired position.

- **Remote-controlled**
  - o Spraying
  - o Filling
  - o Flushing
- **Manually operated**
  - o Drain spray liquid tank
  - o Drain suction chest

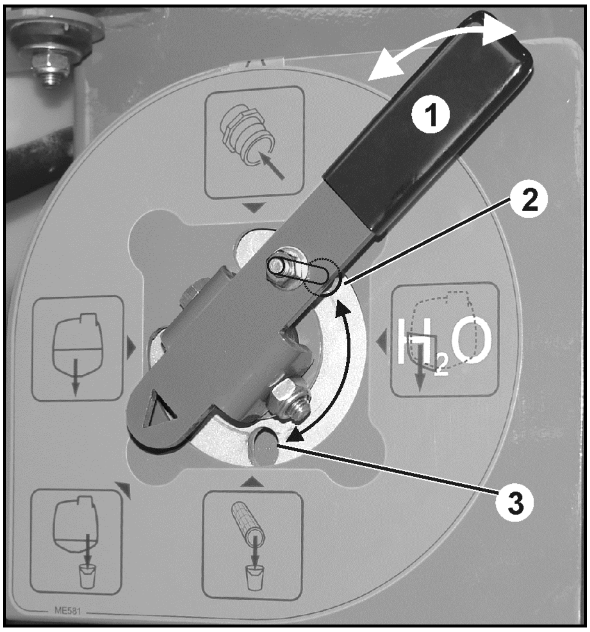


Fig. 77

6 Construction and function of the sprayer boom

The proper condition of the sprayer boom and how it is suspended have considerable influence on the distribution accuracy of the spray liquid. With the spraying height of the sprayer boom to the crop set correctly, a complete overlap is achieved. Nozzles are attached to the boom at intervals of 50 cm.

Profi-folding:

The boom is operated via the operating terminal.

→ During use, locate tractor control unit *red*.

See operating manual for software ISOBUS!

Profi-folding consists of the following functions:

- Folding the sprayer boom in and out,
- Hydraulic height adjustment,
- Hydraulic tilt adjustment,
- Folding in one side of the sprayer boom
- One-sided, independent raising and lowering of the sprayer boom / boom extension (Profi-folding II only).

Folding via the tractor control unit

The boom is operated via tractor control units.

- Depending on equipment, sprayer boom folding must be selected using the operating terminal and carried out using tractor control unit *green* (preselected folding).

  See operating manual for software ISOBUS
- Height adjustment is controlled via tractor control unit *yellow*.

Folding out and in

CAUTION

It is prohibited to fold the sprayer boom in and out during travel.

DANGER

Always maintain an adequate distance from overhead cables when folding the sprayer boom out and in. Contact with overhead cables may lead to fatal injuries.

WARNING

Risk of crushing the entire body and impact due to personnel becoming trapped by laterally-swivelling machine parts.

These dangers can cause extremely serious and potentially fatal injuries.

Maintain an adequate safety distance from moving machine parts while the tractor engine is running.

Ensure that all personnel maintain an adequate safety distance from moving machine parts.

Instruct personnel to leave the swivel range of any moving machine parts before swivelling the parts.

WARNING

Danger for third parties from crushing, being drawn in and/or caught by the moving parts of the boom or impact if they stand in the swivel range of the boom while it is folding out or in.

- Instruct personnel to leave the swivel range of the boom before you fold the boom out or in.
- Release the control for folding the boom out and in immediately if someone enters the swivel range.

WARNING

Risk of crushing and impact for other road users if the boom accidentally unfolds from the transport position during road transport.

Lock the folded boom package in the transport position using the transport safety catch before undertaking road transport.

The hydraulic cylinders for boom folding maintain their respective end positions (transport position and working position) in both the folded-in and folded-out boom state.

6.1 Super-L1-Gestänge

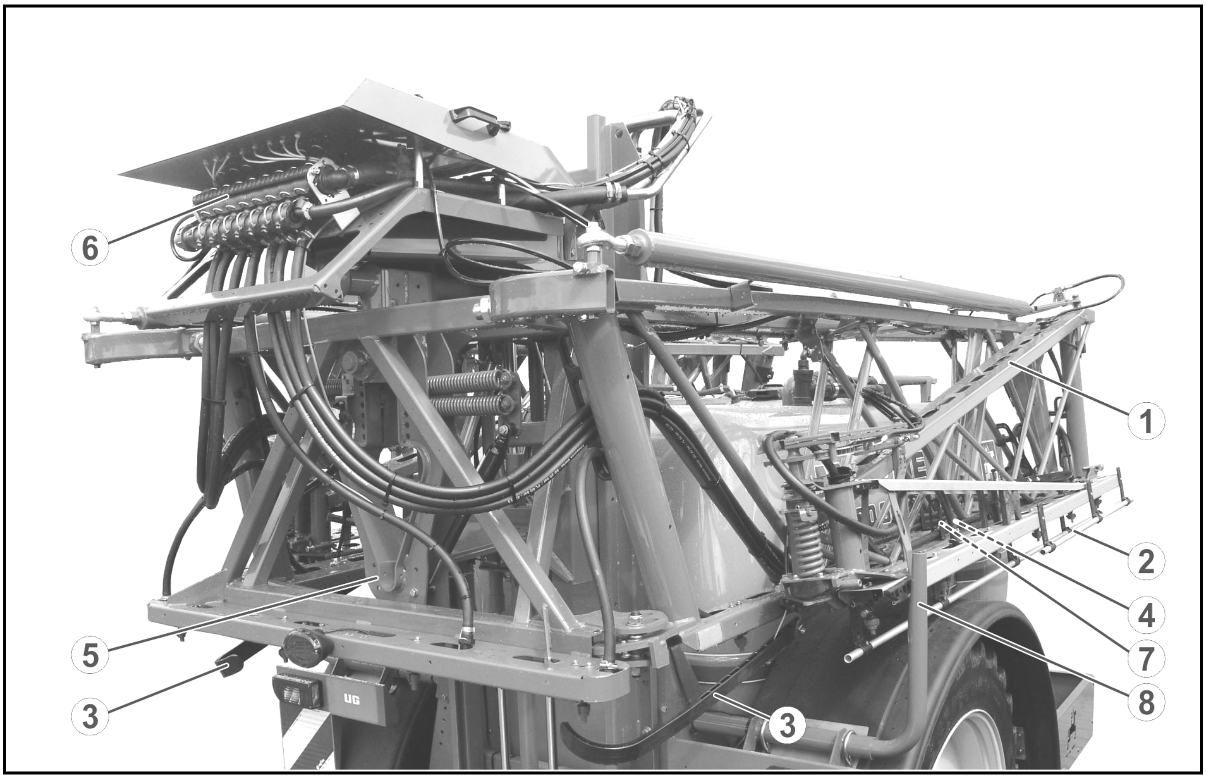


Fig. 78

(1)	Sprayer boom with spray lines (folded boom package is shown here).
(2)	Nozzle protection tube
(3)	Spacer
(4)	Catch hooks as transport locking mechanism
(5)	Vibration compensation
(6)	Part width section fittings
(7)	Boom support
(8)	Safety clip as transport locking mechanism

Locking and unlocking the transport locking mechanism

Unlocking the transport locking mechanism

Raise the sprayer boom using the height adjustment, until

- the catch hooks (Fig. 79/1) release the boom support (Fig. 79/2).
- the boom is completely raised above the safety clip.

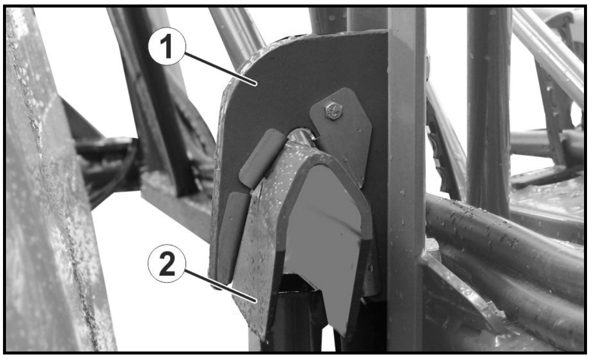


Fig. 79

Locking the transport locking mechanism Completely lower the sprayer boom using the height adjustment, until

- the catch hooks (Fig. 79/1) latch onto the boom support (Fig. 79/2).
- the boom is locked using the safety clip (Fig. 80/1).

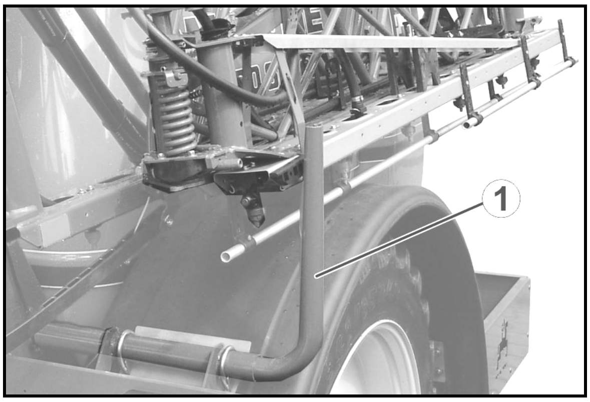


Fig. 80

6.2 Super-S boom

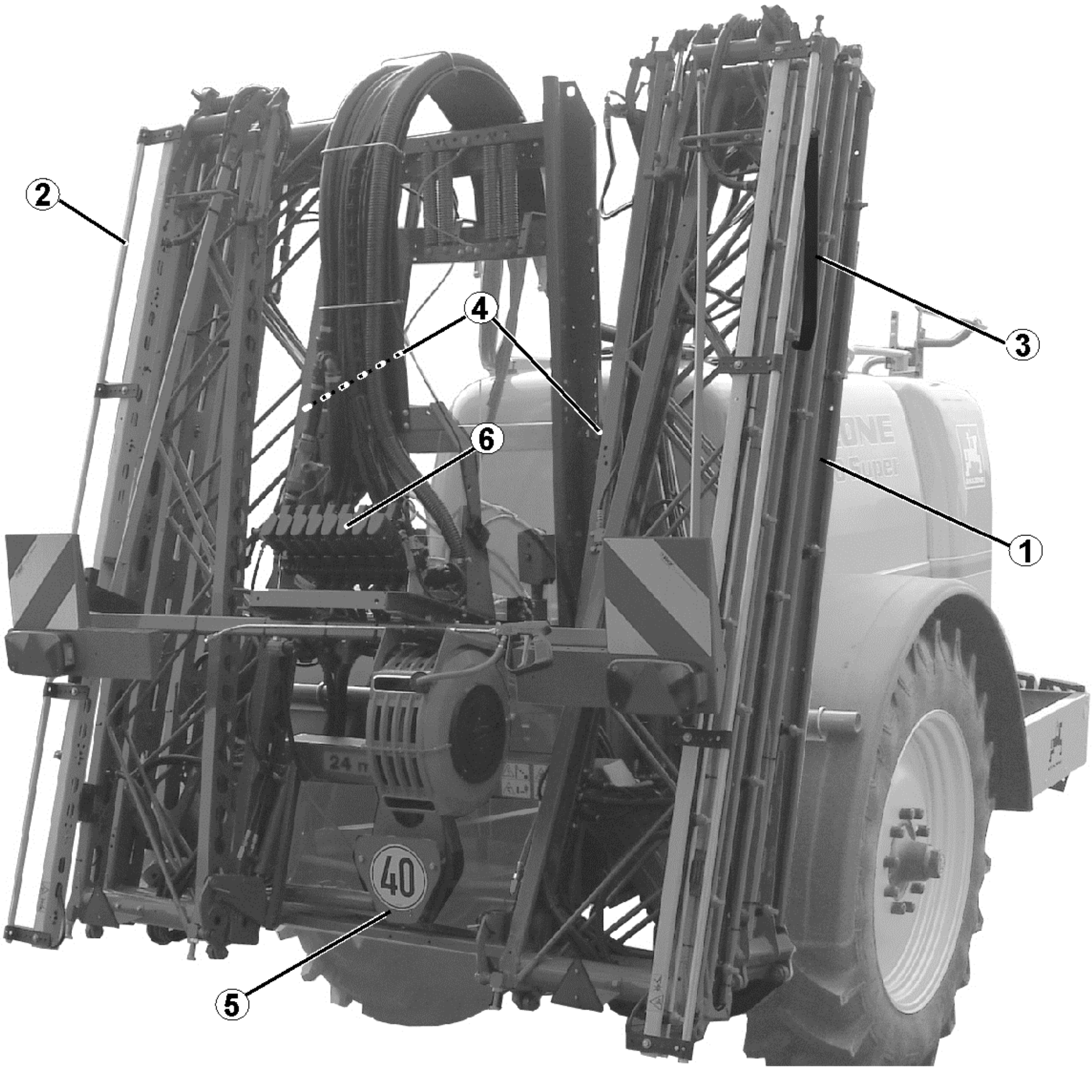


Fig. 81

Fig. 81/...

(1) Sprayer boom with spray lines (here: folded boom package).

(2) Nozzle protection tube

(3) Spacer

(4) Outer boom locking, see Seite 103

(5) Swing compensation, see Seite 104.

(6) Part width section valve

Unlocking and locking the transport safety catch

Unlocking the transport safety catch

Raise the sprayer boom using height adjustment until the catching lugs (**Fig. 82** /1) are released from the catching sockets (**Fig. 82** /2).

→ The transport safety catch unlocks the sprayer boom from the transport position.

Fig. 82 shows the unlocked sprayer boom.

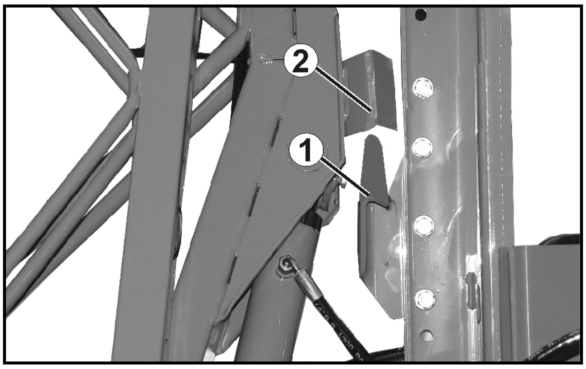


Fig. 82

Locking the transport safety catch

Lower the sprayer boom fully using height adjustment, until the catching lugs (Fig. 83/1) grasp the catching sockets (Fig. 83/2) aufnehmen.

→ The transport safety catch locks the sprayer boom in the transport position.

Fig. 83 shows the locked sprayer boom.

If the catching lugs (Fig. 83 /1) do not grasp the catching sockets (Fig. 83 /2), align the sprayer boom using tilt adjustment.

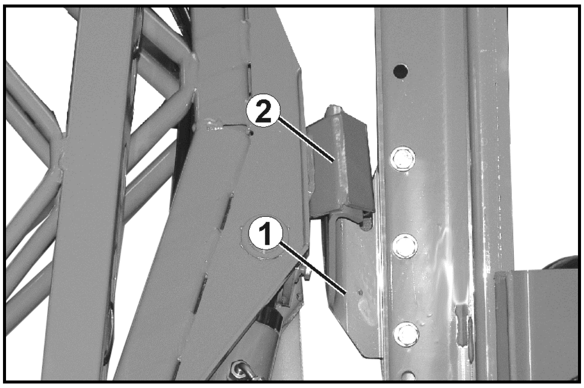


Fig. 83

6.3 Part width section valve TG

Fig. 84 – Super-S

Fig. 85 – Super-L1

(1) Bypass valve

(2) Pressure connection for the spraying-pressure pressure gauge
(with drain cock and test connection)

(3) Flow meter for determining the spray rate [l/ha]

Flow meter only with control terminal

(4) Motor valves for switching the boom part width sections on and off

(5) Boom part width section return flow. Serves for pressure relief; with the sprayer boom switched off, the residual pressure of the spray liquid in the sprayer boom decreases via this return flow, thus ensuring drip-free switching off of the nozzles in conjunction with the diaphragm valves in the nozzles

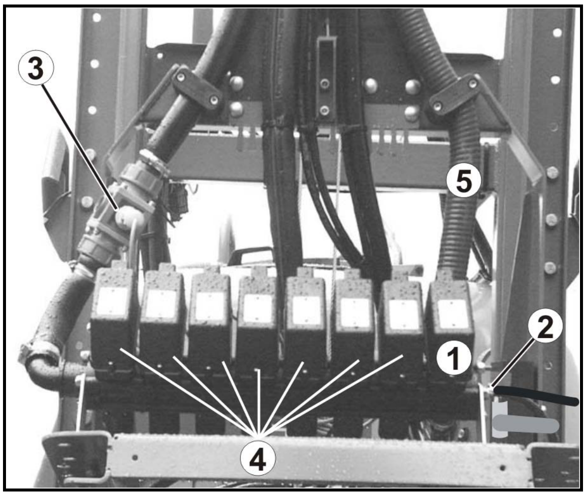


Fig. 84

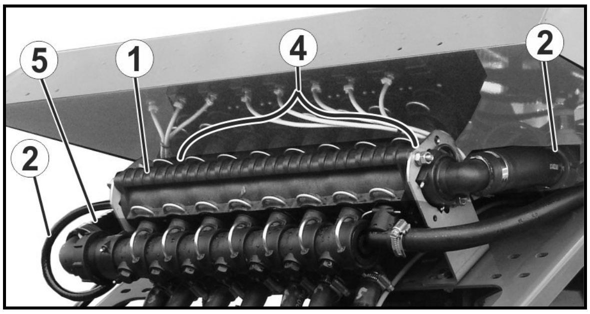


Fig. 85

6.4 Outer boom locking

The outer boom locking mechanisms protect the boom from damage if the outer boom sections come into contact with solid obstructions. The locking mechanism enables the outer boom section to avoid collision by moving around the articulated axle in and against the direction of travel; it is then automatically returned to its working position.

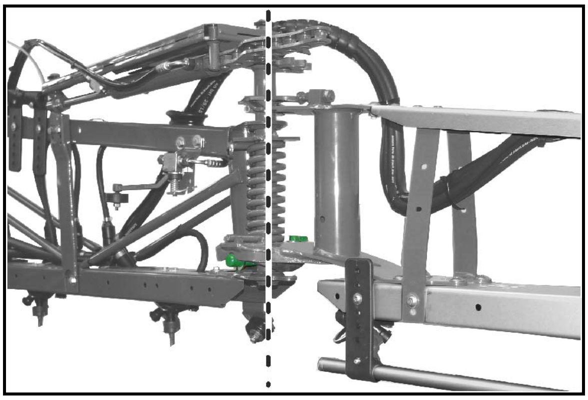


Fig. 86

6.5 Swing compensation

The operating terminal shows when swing compensation (Fig. 87/1) is locked.

Fig. 87/…

(1) Swing compensation unlocked.

(2) Swing compensation locked.

For illustration purposes, in this image the protective device has been removed from the swing compensation.

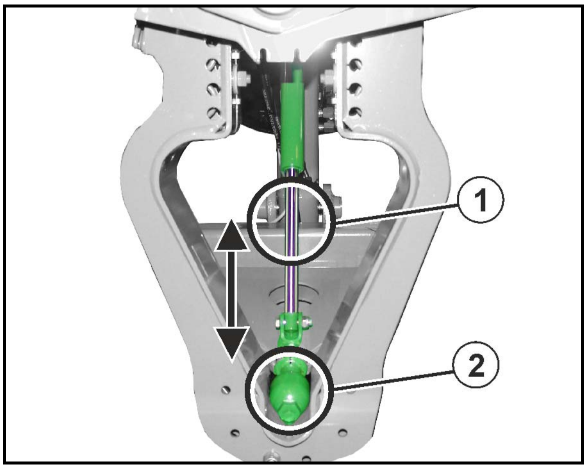


Fig. 87

Unlocking the swing compensation:

Even lateral distribution can only be achieved with the swing compensation unlocked.

After the sprayer boom is fully folded out, actuate the operating lever for another 5 seconds.

→ The swing compensation (Fig. 87/1) unlocks and the unfolded sprayer boom can swing free opposite the boom frame.

Locking the swing compensation:

- **For road transport**
- **When folding the boom out and in.**

Folding via the tractor control unit:

The swing compensation automatically locks before the booms fold in.

6.6 Folding via the tractor control unit

Preselected folding: depending on the equipment, you must press the "fold sprayer boom" preselection button on the operating terminal before activating tractor control unit *green*, in order to fold out the sprayer boom.

Adjust spraying height

WARNING

Risk of crushing and impact for personnel who are caught while the height of the sprayer boom is being raised or lowered.

Direct people out of the danger area of the machine before raising or lowering the sprayer boom using height adjustment.

1. Direct people out of the danger area of the machine.
2. Set spraying height as per spray table via

- Actuate tractor control unit *yellow*.
- Operating terminal (with Profi-folding).

Always align the sprayer boom parallel to the ground; only then can the specified spraying height be achieved on all nozzles.

Folding out the sprayer boom

1. Actuate tractor control unit *yellow*.

→ Raise the boom to unlock it from its transport position.

2. Activate tractor control unit *green* until

→ Super-S: both boom packages are folded down

→ the individual segments are fully folded out

→ and the swing compensation is unlocked.

- The appropriate hydraulic cylinders lock the boom in its working position.
- Folding out does not always happen symmetrically.

3. Actuate tractor control unit *green*

→ Set the spraying height for the sprayer boom.

Folding in the sprayer boom

1. Actuate **tractor control unit** *green*.

→ Super-L1: completely raise the sprayer boom

→ Super S: Raise the sprayer boom to a medium height

2. Set tilt adjustment to "0" (if present).
3. Actuate **tractor control unit** *yellow* until

→ the individual segments of the two booms are fully folded in.

→ Super S: the two boom packages are folded in.

→ Super L1: both the boom packages are swivelled to the front..

4. Actuate **tractor control unit** *green*.

→ Lower the boom, locking it in the transport position.

CAUTION

Only drive in locked transport position.

The swing compensation locks automatically before the boom folds in.

6.6.1 Working with the sprayer boom folded out on one side

Working with the sprayer boom only folded out on one side is only permissible

- with the swing compensation locked.
- only if the other boom is folded down as a package from the transport position (Super-S boom).
- briefly for passing obstacles (trees, electricity pylons, etc.).

- Lock the swing compensation before folding/unfolding the sprayer boom on one side.

  If the swing compensation is not locked, the sprayer boom may swing off to one side. If the unfolded boom extension strikes the ground, this can cause damage to the sprayer boom.
- Use a significantly reduced speed for spraying operation to avoid the sprayer boom swinging out and coming into contact with the ground with the swing compensation locked. Unless the sprayer boom is guided smoothly, even lateral distribution cannot be guaranteed.

The sprayer boom is fully unfolded.

1. Lock the swing compensation.
2. Using the height adjustment, lift the sprayer boom to a medium height.
3. Fold up the desired boom extension.

WARNING

Super-S- boom:

Folded-in boom must remain in horizontal position!

After folding in, the boom lifts into the transport position.

→ Interrupt the folding process in good time for one-sided spraying.

WARNING

Super-L1- boom: Folded-in boom must remain in horizontal position! After folding in, the boom lifts into the transport position.

→ Interrupt the folding process in good time for one-sided spraying

4. Align the sprayer boom using tilt adjustment so it is parallel to the target surface.
5. Set the spraying height for the sprayer boom such that the sprayer boom is a minimum of 1 m off the ground.
6. Switch off the part width sections of the folded-in boom.
7. During spraying operation, drive at a significantly reduced speed.

6.7 Reduction joint on the outer boom (optional)

Using the reduction joint, the outer element of the outer boom can be folded manually to reduce the working width.

Case 1:

Number of nozzles outer part width section = Number of nozzles on the foldable outer element

→ When spraying with a reduced working width, keep the outer part width sections switched off.

Case 2:

Number of nozzles outer part width section ≠ Number of nozzles on the foldable outer element

→ Close the outer nozzles manually (triple nozzle head).

→ Perform changes on the control terminal.

  - o Enter the changed working width.
  - o Enter the changed number of nozzles on the outer part width sections.

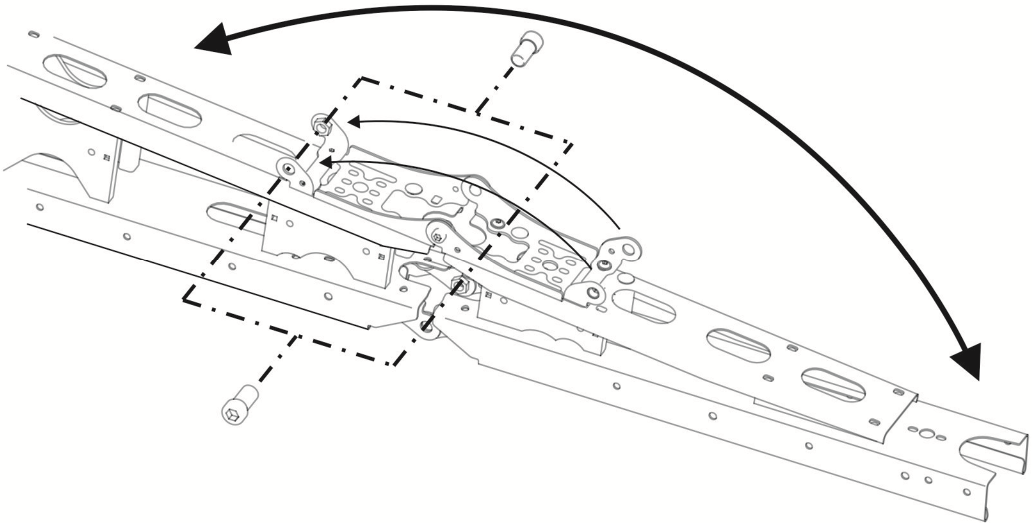


Fig. 88

2 bolts lock the folded and unfolded outer element in its respective end positions.

CAUTION
Before road transport, unfold the outer elements again so that the transport locking mechanism is active when the boom is folded.

6.8 Boom width reduction (option)

With the boom width reduction, one or two booms can remain folded in during operation depending on the version.

In addition, switch on the hydraulic accumulator (optional) as a collision protection.

The respective boom part width sections have to be activated in the on-board computer.

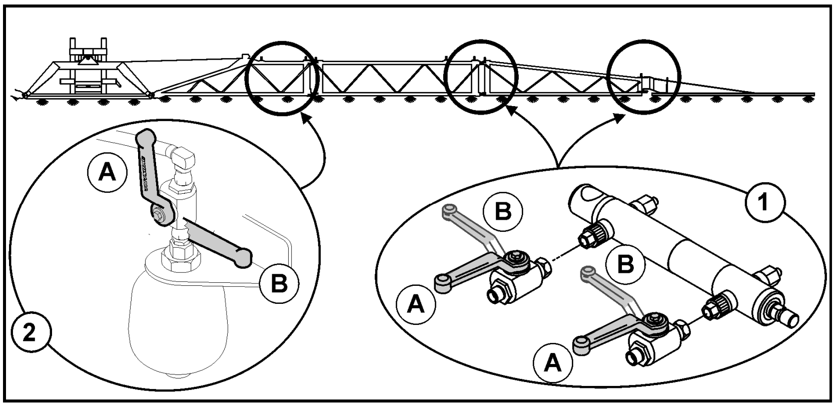


Fig. 89

(1) Boom width reduction

(2) Boom width damping (Option)

(A) Stop tap opened

(B) Stop tap closed

Working with reduced working width

1. Reduce the boom width hydraulically.
2. Close the stop taps for the boom width reduction.
3. Open the stop tap for the boom damping.
4. Deactivate the respective boom part width sections in the on-board computer.
5. Perform work with reduced working width.

Close the stop tap for the boom damping.

- For road transport
- For use with full working width

6.9 Boom extension (option)

The boom extension increases the working width infinitely up to 1.20 metres.

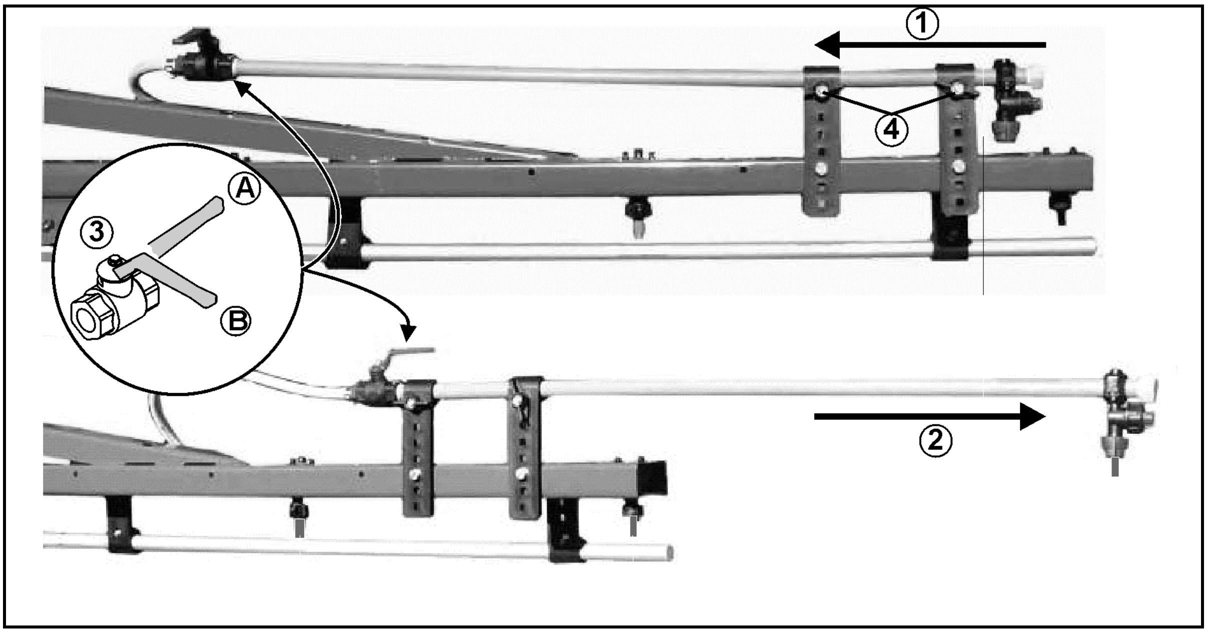


Fig. 90

(1) Boom extension in transport position

(2) Boom extension in working position

(3) Stop tap for the outer nozzle

(A) Stop tap opened

(B) Stop tap closed

(4) Wing bolts for securing the boom extension in the transport or working position

6.10 Hydraulic tilt adjustment (optional)

In unfavourable ground conditions, e.g. when there are ruts of variable depth or when driving with one side of the vehicle in a furrow, the sprayer boom can be aligned parallel to the ground or to the target surface using hydraulic tilt adjustment.

Adjust using:

- AMATRON 3
- AMASPRAY$^+$
- tractor control unit *natural*.

See the operating manual for the operating terminal.

6.11 DistanceControl (optional)

The DistanceControl regulating unit for the sprayer boom automatically holds the sprayer boom parallel at the desired distance from the target surface.

- DistanceControl with 2 sensors
- DistanceControl with 4 sensors

Ultrasound sensors (Fig. 91/1) detect the distance to the ground or the crop. If the height deviates from the desired measurement on one side, the DistanceControl regulates the tilt adjustment in order to adjust the height. If the terrain rises on both sides, the height adjustment raises the entire boom.

Switching off the sprayer boom on a headland will automatically raise the sprayer boom by approx. 50 cm. When switched back on again, the sprayer boom is lowered back to the calibrated height.

See operating manual for software ISOBUS.

- Setting the ultrasound sensors:

→ see Fig. 91.

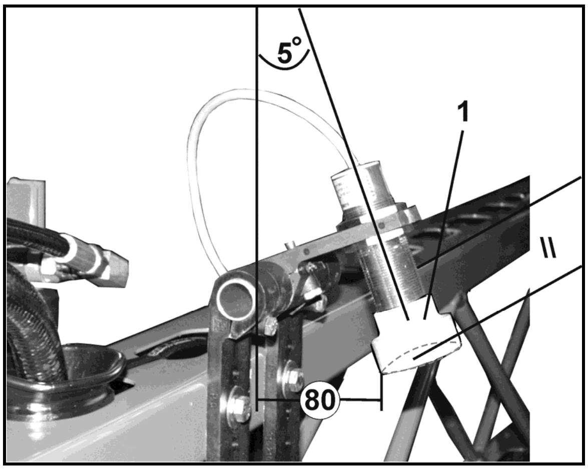


Fig. 91

6.12 Spray lines and nozzles

The sprayer booms can be fitted with various spray lines. In turn, the spray lines can be fitted with single nozzles or multi nozzles, depending on the predominant conditions of use.

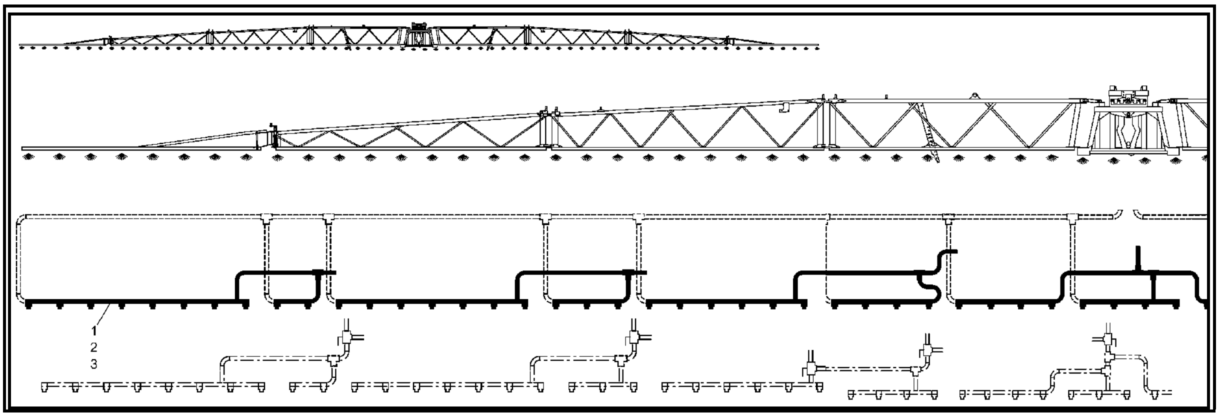


Fig. 92

6.12.1 Technical data

Ensure that the residue in the spray line is still being sprayed at an undiluted concentration. Always spray this residue on an untreated area. The residue contained in the spray line is dependent on the sprayer boom working width.

Formula for calculating the required distance in [m] for spraying out the undiluted residue in the spray line:

$$\text{Required distance [m]} = \frac{\text{Undiluted residue [l]} \times 10{,}000\ [\text{m}^2/\text{ha}]}{\text{Spray rate [l/ha]} \times \text{working width [m]}}$$

Spray line Super-S2 sprayer boom with single nozzles or multi-nozzles

Working width	Number of part width sections	Number of nozzles per part width section	Residue	• dilutable	• not dilutable	• total	Residue in pressure circulating system (DUS)	• dilutable	• not dilutable	• total	Weight
[m]			**[l]**								**[kg]**
15	5	6-6-6-6-6		4,5	7,0	11,5		12,5	1,0	13,5	11,0
	7	3-5-5-4-5-5-3		4,5	7,5	12,0		13,0	1,0	14,0	12,0
16	5	7-6-6-6-7		4,5	7,5	12,0		13,0	1,0	14,0	12,0
18	5	6-8-8-8-6		4,5	8,0	12,5		13,5	1,0	14,5	13,0
	7	5-6-5-4-5-6-5		4,5	8,5	13,0		14,0	1,0	15,0	14,0
20	5	8-8-8-8-8		4,5	8,5	13,0		14,0	1,0	15,5	15,0
	7	5-6-5-4-5-6-5		4.5	9.5	14.0		15.0	1.0	16.0	16,0
21	5	9-8-8-8-9		4,5	9,0	13,5		14,0	1,5	16,0	18,0
	7	6-6-6-6-6-6-6		5,0	10,0	15,0		16,0	1,5	17,5	20,0
	9	4-4-6-5-4-5-6-4-4		5,0	11,0	16,0		17,0	1,5	18,5	22,0
	11	4-4-3-3-5-4-5-3-3-4-4		5.5	15.5	21.0		17.5	1.5	19.0	24,0
21/15	7	6-6-6-6-6-6-6		5,0	10,0	15,0		16,0	1,5	17,5	20,0
	9	4-4-6-5-4-5-6-4-4		5,0	11,0	16,0		17,0	1,5	18,5	22,0
	11	3-3-4-4-5-4-5-4-4-3-3		5.5	15.5	21.0		17.5	1.5	19.0	24,0
24	5	9-10-10-10-9		5,0	10,0	15,0		16,0	1,5	17,5	21,0
	7	6-6-8-8-8-6-6		5,0	11,5	16,5		17,5	1,5	19,0	22,0
	9	6-5-6-5-4-5-6-5-6		5,0	12,0	17,0		18,0	1,5	19,5	23,0
	11	4-4-5-4-5-4-5-4-5-4-4		5.5	16.5	22.0		23.5	1.5	25.0	24,0
27	7	9-6-8-8-8-6-9		5,0	12,5	17,5		18,5	2,0	20,5	27,0
	9	6-6-6-6-6-6-6-6-6		5,5	17,5	23,0		24,0	2,0	26,0	29,0
	11	6-6-4-4-5-4-5-4-4-6-6		5.5	21.5	27.0		28.0	2.0	30.0	31,0
28	7	8-8-8-8-8-8-8		5,0	13,0	18,0		19,0	2,0	21,0	28,0
	9	7-6-6-6-6-6-6-6-7		5,5	17,5	23,0		24,0	2,0	26,0	30,0
	11	5-5-5-6-5-4-5-6-5-5-5		5.5	22.5	28.0		29.0	2.0	31.0	32,0
30	7	8-9-8-10-8-9-8		5,0	13,5	18,5		19,5	2,5	22,0	29,0
	9	6-6-7-7-8-7-7-6-6		5,0	18,0	23,5		24,5	2,5	27,0	31,0
	11	6-6-5-6-5-4-5-6-5-6-6		5,0	23,0	28,5		29,5	2,5	32,0	33,0

Spray line Super-L1-sprayer boom with single nozzles or multi-nozzles

Working width	Number of part width sections	Number of nozzles per part width section	Residue	• dilutable	• not dilutable	• total	Residue in pressure circulating system (DUS)	• dilutable	• not dilutable	• total	Weight
[m]			**[l]**								**[kg]**
21	5	8-9-8-9-8		4,5	9,0	13,5		14,0	1,5	16,0	18,0
	7	6-6-7-4-7-6-6		5,0	10,0	15,0		16,0	1,5	17,5	20,0
	9	6-4-5-4-4-4-5-4-6		5.5	16.0	21.5		23.0	1.5	24.5	20,0
	11	3-3-4-5-4-4-4-5-4-3-3		5.5	22.0	27.5		28.5	1.5	30.0	20,0
24	5	9-10-10-10-9		5,0	10,0	15,0		16,0	1,50	17,5	22,0
	7	6-6-8-8-8-6-6		5,0	11,5	16,5		17,5	1,5	19,0	22,0
	9	6-5-5-5-6-5-5-5-6		5.5	17.0	22.5		23.5	2.0	25.5	28,0
	11	5-4-5-4-4-4-4-4-5-4-5		5.5	22.5	28.0		29.0	2.0	31.0	30,0
27	7	8-7-8-8-8-7-8		5,0	12,5	17,5		18,5	2,0	20,5	27,0
	9	6-6-6-6-6-6-6-6-6		5,5	17,5	23,0		24,0	2,0	26,0	29,0
	11	4-4-4-5-7-6-7-5-4-4-4		5.5	21.5	27.0		28.0	2.0	30.0	31,0
28	7	9-7-8-8-8-7-9		5,0	13,0	18,0		19,0	2,0	21,0	28,0
	9	7-6-6-6-6-6-6-6-7		5,5	17,5	23,0		24,0	2,0	26,0	30,0
	11	4-4-5-5-7-6-7-5-5-4-4		5.5	22.5	28.0		29.0	2.0	31.0	32,0

6.12.2 Single nozzles

Fig. 93/...

(1) Nozzle body with bayonet connection (standard).

(2) Diaphragm. If the pressure in the spray line falls below approx. 0.5 bar, the spring element (3) presses the diaphragm onto the diaphragm seat (4) in the nozzle body. This ensures that when the sprayer boom is switched off, the nozzles are deactivated without subsequent dripping.

(3) Spring element.

(4) Diaphragm seat.

(5) Slider - holds the entire diaphragm valve in the nozzle body.

(6) Nozzle filter; **fitted as standard on machines with 50 mesh/inch**, is inserted from below into the nozzle body. Refer to the "Nozzle filter" section.

(7) Rubber seal.

(8) Nozzle.

(9) Bayonet connection.

(10) Coloured bayonet cap.

(11) Spring element housing.

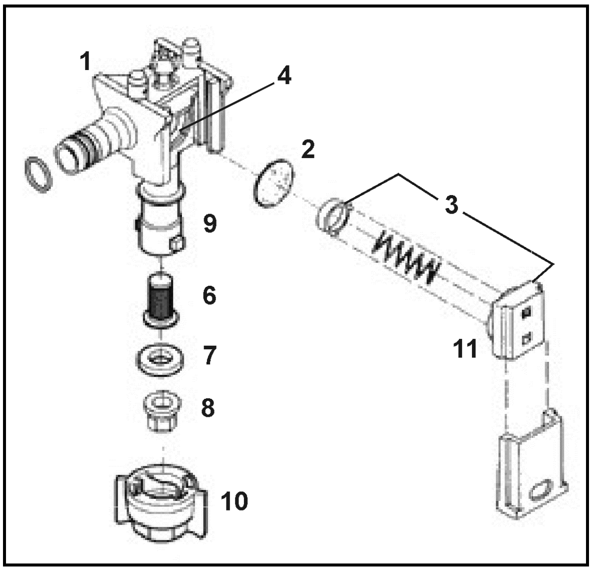


Fig. 93

6.12.3 Multi nozzles (optional)

It is beneficial to use multiple nozzles (Fig. 94). when using various nozzle types. In each case, the nozzle pointing upwards is the one that is supplied.

Turning the multi nozzles head (Fig. 94/1) anticlockwise brings a different nozzle into play.

The multi nozzles head is switched off in the intermediate positions. This provides the possibility of reducing the working width of the boom.

Rinse the spray lines before twisting the multi nozzles head onto another nozzle type.

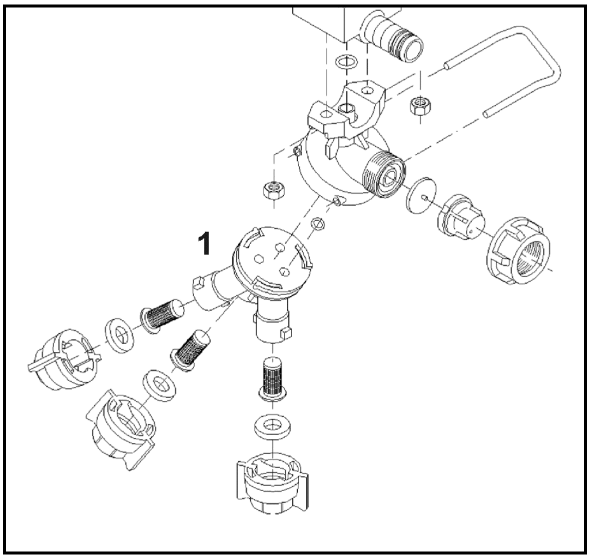


Fig. 94

Fig. 95/...

(1) Nozzle carrier.

(2) Triple nozzle head.

(3) Diaphragm. If the pressure in the nozzle line falls below approx. 0.5 bar, the spring element (4) presses the diaphragm onto the diaphragm seat (5) in the three-way nozzle carrier. This ensures that when the sprayer boom is switched off, the nozzles are deactivated without subsequent dripping.

(4) Spring element.

(5) Diaphragm seat.

(6) Sleeve nut - holds the entire diaphragm valve in the three-way nozzle carrier.

(7) Nozzle filter; fitted as standard on machines with 50 mesh/inch.

(8) Rubber seal.

(9) Bayonet cap.

(10) O-ring.

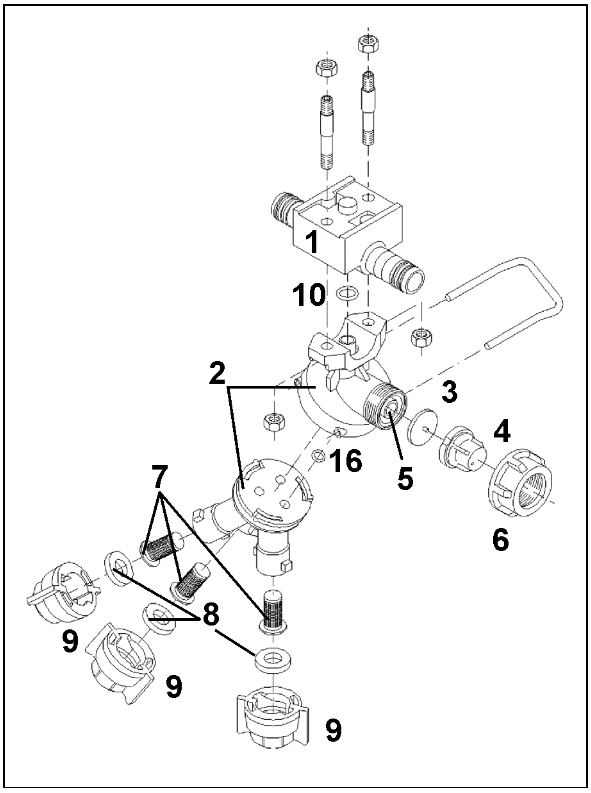


Fig. 95

6.12.4 Electric boundary nozzles (optional)

Using boundary nozzle switching, the last nozzle can be switched off from the tractor and a boundary nozzle can be electrically switched on 25 cm further out (right at the edge of the field).

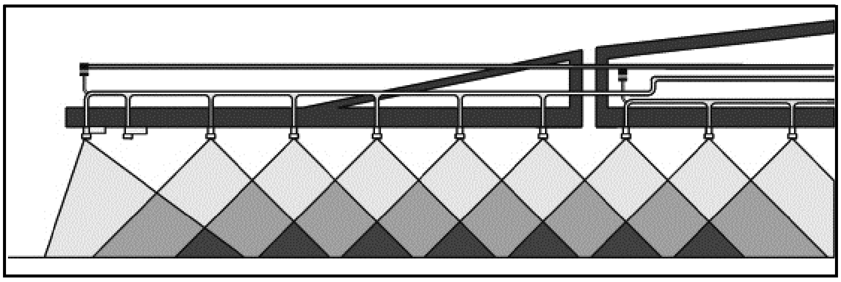


Fig. 96

6.12.5 Electric end nozzle switching (optional)

Using end nozzle switching, up to three of the outer nozzles at the edge of the field close to a water source can be electrically switched off from the tractor).

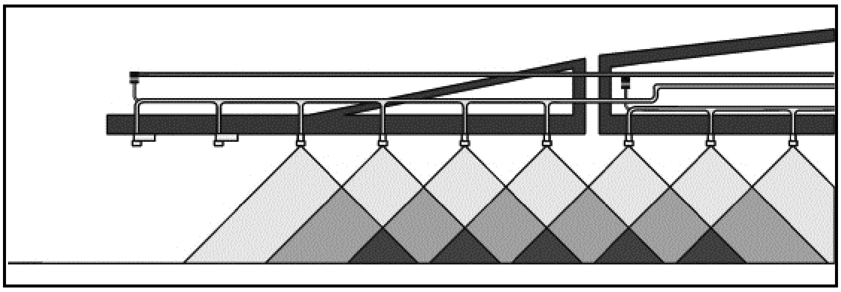


Fig. 97

6.12.6 Electric additional nozzle switching (optional)

With the additional nozzle switching, another exterior nozzle is cut in, increasing the working width by one metre.

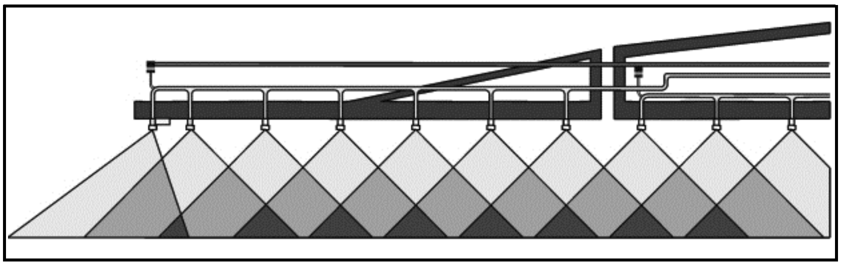


Fig. 98

6.12.7 Line filter for spray lines (optional)

Line filters (Fig. 99/1) are

- fitted in the spray lines in each part width section.
- an additional measure to avoid contamination of the spraying nozzles.

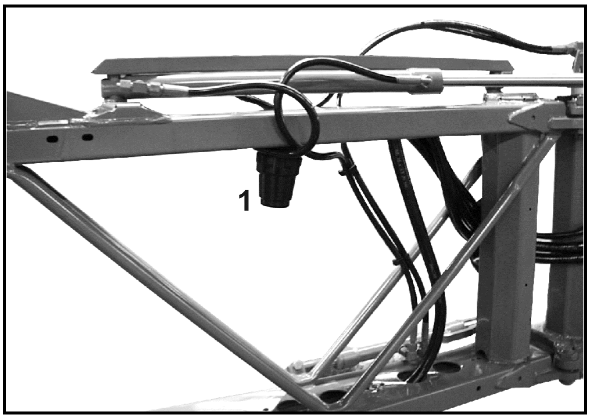


Fig. 99

Overview of the filter inserts

- Filter insert with 50 mesh/inch (series, blue)
- Filter insert with 80 mesh/inch (grey)
- Filter insert with 100 mesh/inch (red)

6.13 Automatic single nozzle control (optional)

50 cm part width sections can be controlled separately by the electric single nozzle control. In combination with the automatic part width section control "Section Control", overlapping can be reduced to a minimum area.

6.13.1 Single nozzle control AmaSwitch

Each nozzle can be switched on and off separately via Section Control.

6.13.2 4-way AmaSelect single nozzle control

- The sprayer boom is fitted with 4-way nozzle bodies. Each of them is operated by an electric motor.
- The nozzles can be switched on or off as desired (depending on Section Control).
- Due to the 4-way nozzle bodies, several nozzles can be simultaneously active in a nozzle body.
- Alternatively, the nozzles can be manually selected.
- For boundary treatment, an extra nozzle body can be separately configured.
- LED single nozzle illumination integrated in the nozzle body.
- Nozzle distance of 25 cm possible (optional)

6.14 Special optional equipment for liquid fertiliser

There are currently two main types of liquid fertiliser available:

- Ammonium nitrate / urea solution (AUS) with 28 kg N per 100 kg AUS.
- An NP solution 10-34-0 with 10 kg N and 34 kg P_2O_5 per 100 kg NP solution.

If the liquid fertiliser is sprayed using flat-fan nozzles, multiply the corresponding values from the spray table for the spray rate (l/ha) by 0.88 for AUS and by 0.85 for NP solutions, as the spray rates listed (in l/ha) only apply for water.

As a rule:

Use coarse-dropped application for liquid fertiliser to avoid chemical burns to the plants. Overly large drops roll off the leaf and drops which are too small cause a magnifying glass effect, which burns the leaves. Too much fertiliser may cause burns to appear on the leaves due to the salt concentration in the fertiliser.

As a rule, do not spray more liquid fertiliser than, for example, 40 kg N (see also "Conversion table for spraying liquid fertiliser"). Always discontinue nozzle-based AUS fertilisation at development stage EC-39, because chemical burns to on ears have a particularly bad effect.

6.14.1 Three-ray nozzles (optional)

The use of three-ray nozzles for applying liquid fertiliser is beneficial if the liquid fertiliser needs to be taken up more by the roots of the plant than through the leaves.

Thanks to its three openings, the dosing aperture, which is integrated into the nozzle, ensures a coarse-dropped, almost depressurised distribution of the liquid fertiliser. This prevents an undesirable spray mist and the formation of smaller drops. The coarse drops produced by the three-ray nozzle hit the plants with little force and roll off their surface. **Although this avoids damage from burns to the greatest extent possible, avoid the use of three-ray nozzles for late top dressing and use drag hoses.**

For all three-ray nozzles listed in the following, only use the black bayonet nut.

Different three-ray nozzles and their operational areas (at 8 km/h)

yellow	50 - 80l AUS / ha
red	80 - 126l AUS / ha
blue	115 - 180l AUS / ha
white	155 - 267l AUS / ha

6.14.2 7 hole nozzles / FD nozzles (optional)

The same conditions apply for using 7 hole nozzles / FD nozzles as for the three-ray nozzles. In contrast to the three-ray nozzle, in the case of the 7 hole nozzle / FD nozzles, the outlets are not oriented downwards, but instead point to the side. This allows very large drops to be produced on the plants using only slight impact forces.

Fig. 100:	→	7 hole nozzle
Fig. 101:	→	FD nozzle

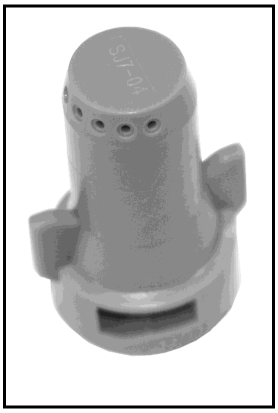


Fig. 100

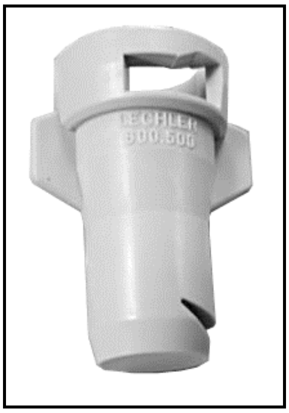


Fig. 101

The following 7-hole nozzles are available

- SJ7-02-CE 74 – 120l AUS (at 8 km/h)
- SJ7-03-CE 110 – 180l AUS
- SJ7-04-CE 148 – 240l AUS
- SJ7-05-CE 184 – 300l AUS
- SJ7-06-CE 222 – 411l AUS
- SJ7-08-CE 295 – 480l AUS

The following FD nozzles are available

- FD 04 150 - 240 l AUS /ha (at 8 km/h)
- FD 05 190 - 300 l AUS /ha
- FD 06 230 - 360 l AUS/ha
- FD 08 300 - 480 l AUS/ha
- FD 10 370 - 600 l AUS/ha*

6.14.3 Drag hose equipment for **Super-S** boom (optional)

Drag hose unit with dosing discs (no. 4916-39) for late top dressing with liquid fertiliser

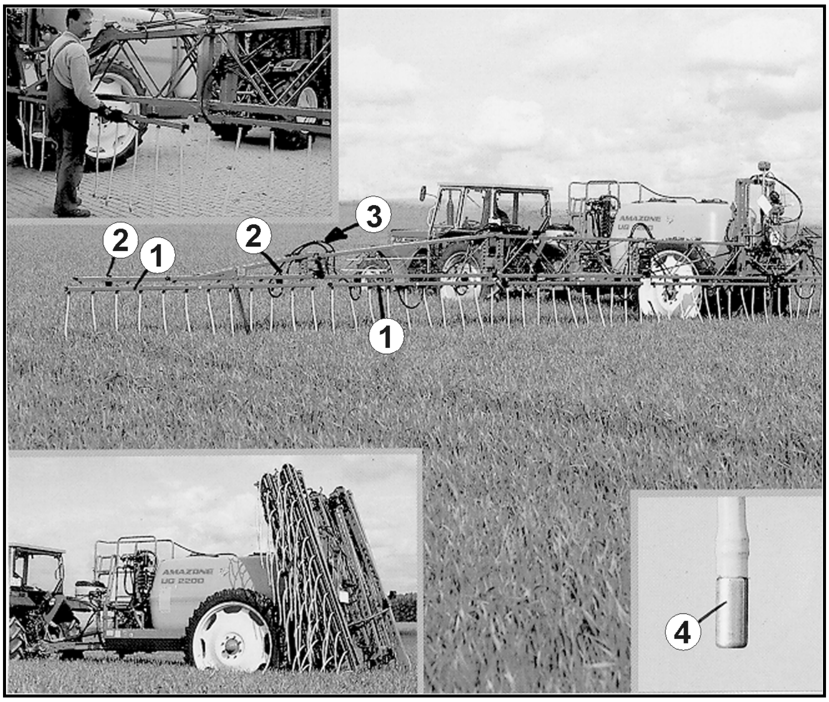


Fig. 102

(1) Numbered, separate drag hose part width sections with 25 cm nozzle distance and hose distance. No. 1 on the left-hand side is fitted on the outside (looking in the direction of travel), no. 2 next to it and so on.

(2) Thumb nuts for securing the drag hose unit.

(3) Turned plug connection for connecting the hoses.

(4) Metal weights - stabilise the position of the hoses during operation.

The dosing discs determine the spray rate [l/ha].

The following dosing discs are available

- 4916-26 dia. 0.65 50 - 104 l AUS/ha (at 8 km/h)
- 4916-32 dia. 0.8 80 - 162 l AUS/ha
- 4916-39 dia. 1.0 115 - 226 l AUS/ha (standard)
- 4916-45 dia. 1.2 150 - 308 l AUS/ha
- 4916-55 dia. 1.4 225 - 450 l AUS/ha

Refer to the section "Spray table for the drag hose unit", Seite 232.

6.15 Foam marker (optional)

Fig. 103/…

(1) Foam concentrate tank

(2) Slotted screw for foam concentrate tank

(3) Compressor

The **foam marker**, which can be retrofitted at any point, makes it possible to **drive the next bout precisely** when spraying **fields without marked-out tramlines**.

Marking involves the use of **foam bubbles**. The foam bubbles are laid at adjustable intervals of approx. 10 – 15 metres, providing a **clearly-visible orientation line**. The foam bubbles dissolve after a certain time without leaving any residue behind.

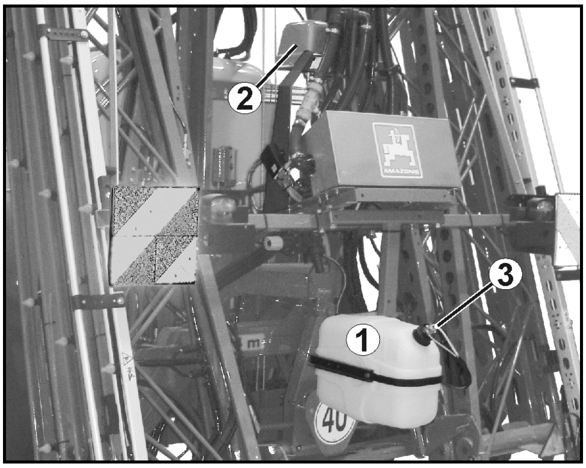


Fig. 103

Set the **interval between the individual applications of bubbles** using the slotted screw as follows:

- turn **clockwise**

→ distance is increased

- turn **anti-clockwise**

→ distance is decreased

Fig. 104/...

(1) Air and liquid agitator

(2) Flexible plastic nozzle

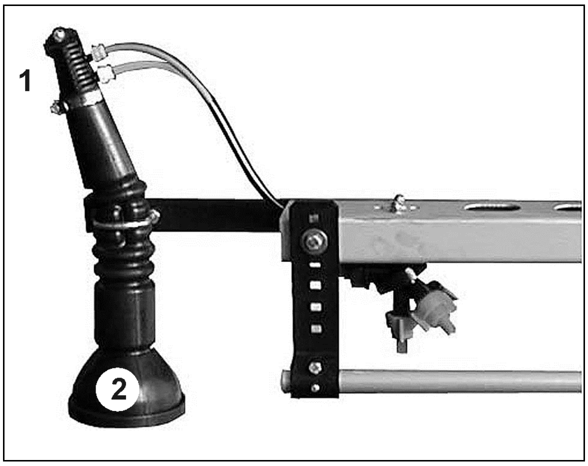


Fig. 104

Operating device

For machines without control terminal:

Fig. 105/...

(1) Left-hand foam marker on

(2) Right-hand foam marker on

(3) Foam marker off

(4) Connection to the compressor

(5) Connection to the tractor power supply

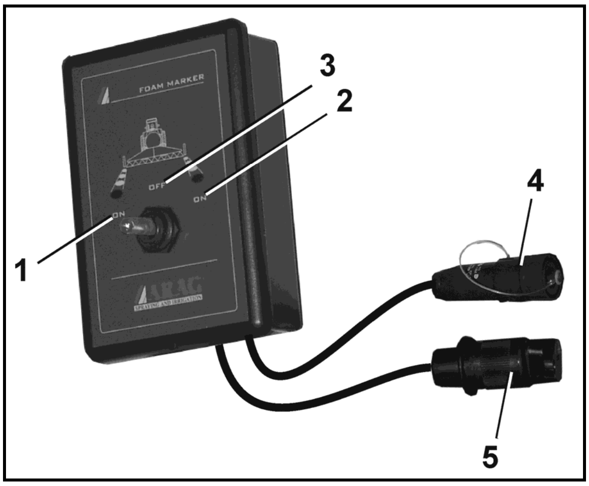


Fig. 105

6.16 Pressure circulating system (DUS) (optional)

- For normal spraying operation, the pressure circulating system should usually be switched on.
- When using drag hoses, the pressure circulating system should usually be switched off.

The pressure circulating system

- enables the constant circulation of liquid in the spray line. For these purposes, a suction port hose (Fig. 106/1) is assigned to each part width section.
- enables operation using spray liquid or flushing water, as desired.
- reduces the undiluted residue for all spray lines to 2 l.

The constant circulation of liquid

- enables production of an even spray pattern right from the start, because spray liquid is available at every spraying nozzle immediately after the sprayer boom is switched on, with no delay.
- prevents damage to the spray line.

The principal components of the pressure circulating system are:

- one suction port hose (Fig. 106/1) per part width section.
- the DUS switchover tap (Fig. 107/1).
- the DUS pressure relief valve (Fig. 107/2). The DUS pressure relief valve is permanently set at the factory and reduces the pressure in the pressure circulating system to 1 bar.

→ If the DUS switchover tap is in position (Fig. 107/A), the pressure circulating system is switched on.

→ If the DUS switchover tap is in position (Fig. 107/B), the pressure circulating system is switched off.

→ if the DUS switchover tap is in position (Fig. 107/C), liquid is released from the field sprayer.

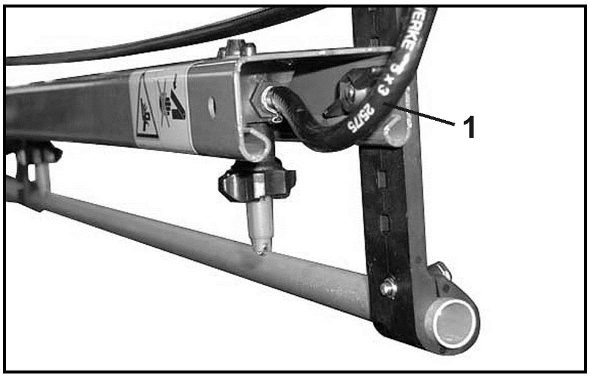


Fig. 106

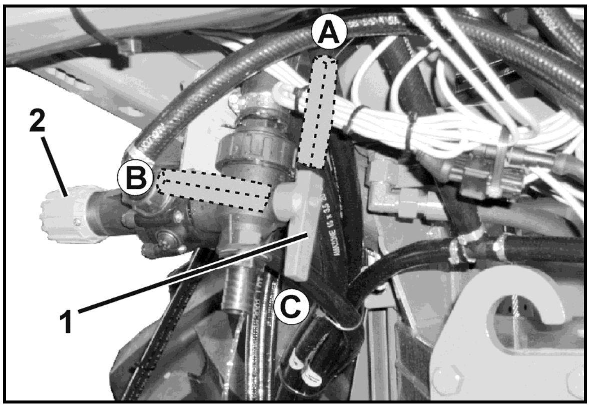


Fig. 107

Overview – pressure circulating system (DUS)

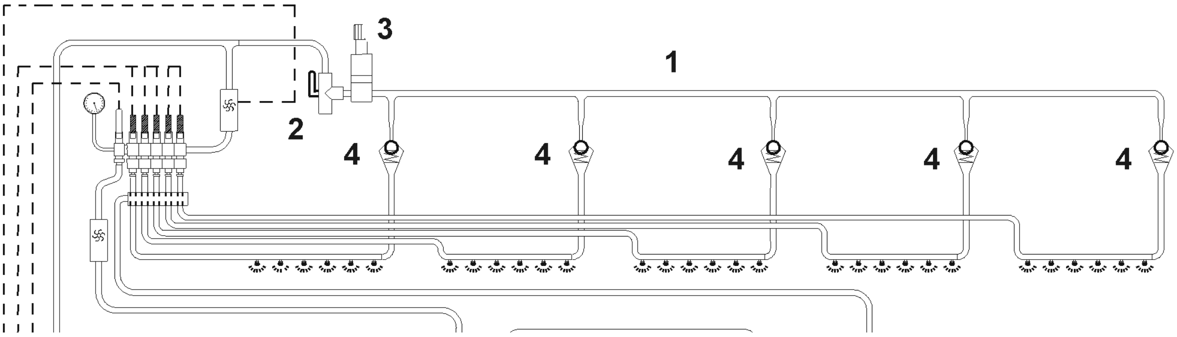


Fig. 108

(1) Pressure circulating system (DUS)

(2) DUS switchover tap

(3) DUS pressure limiting valve

(4) DUS return valve

6.17 Lifting module

(option)

The lifting module allows the sprayer boom to be raised by an additional 70 cm to a nozzle height of 3.20 m.

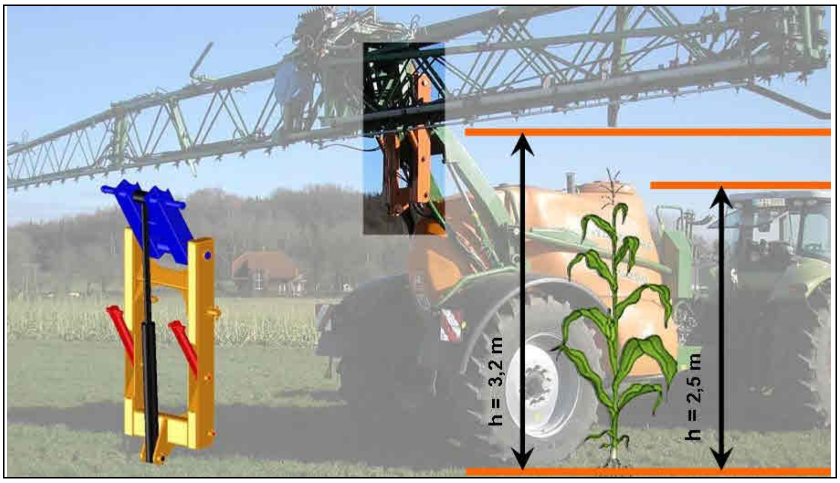


Fig. 109

The lift module is actuated using the tractor control unit *yellow*.

DANGER

Risk of accidents and danger of damaging the implement.

- When driving on the roads, the sprayer boom must not be raised above the lifting module.

→ The total height of the implement with lifting module can be considerably higher than 4 m.

- Use the lifting module only when the sprayer boom is folded out.
- Lower the lifting module again before folding in the sprayer boom. The sprayer boom can otherwise not be put into the transport lock.
- Always lift or lower the lifting module to the end position!

7 Commissioning

This section contains information

- on commissioning your machine.
- on checking if it is possible to connect the machine to your tractor.

- Before operating the machine for the first time the operator must have read and understood the operating manual.
- Comply with the section "Safety information for the user", starting on page 27 when
  - coupling and uncoupling the machine
  - transporting the machine
  - using the machine
- Only couple and transport the machine to a tractor which is suitable for the task.
- The tractor and machine must meet the national road traffic regulations.
- The operator and the user shall be responsible for compliance with the statutory road traffic regulations.

WARNING

Risk of crushing, shearing, cutting, and being drawn in or trapped in the vicinity of hydraulically or electrically actuated components.

Do not block the operator controls on the tractor which are used for hydraulic and electrical movements of components, e.g. folding, swivelling and pushing movements. The movement must stop automatically when you release the appropriate control. This does not apply to equipment movements that:

- are continuous or
- are automatically locked or
- due to their function require a float position or pressure position.

7.1 Checking the suitability of the tractor

WARNING

Risk of breaking during operation, insufficient stability and insufficient tractor steering and braking power from improper use of the tractor.

- Check the suitability of your tractor, before connecting the machine to the tractor.

  You may only connect the machine to tractors suitable for the purpose.
- Carry out a brake test to check whether the tractor achieves the required braking rate with the machine connected.

Requirements for the suitability of a tractor are, in particular:

- Permissible total weight
- Permissible approved axle loads
- Permissible drawbar load at the tractor coupling point
- Load capacity of the tyres fitted
- The approved trailer load must be sufficient

  You can find this data on the rating plate or in the vehicle documentation and in the tractor operating manual.

The front axle of the tractor must always be subjected to at least 20% of the dead-weight of the tractor.

The tractor must achieve the brake rate specified by the tractor manufacturer, even with the machine connected.

7.1.1 Calculating the actual values for the total tractor weight, tractor axle loads and tyre load capacities, as well as the minimum ballast

The permissible total tractor weight, specified in the vehicle documentation, must be greater than the sum of the

- Tractor empty weight,
- Ballast weight and
- Total weight of the connected machine or drawbar load of the connected machine

This information is only valid for the Federal Republic of Germany:

If, having tried all possible alternatives, it is not possible to comply with the axle loads and / or the permissible total weight, then a survey by an officially-recognised motor vehicle traffic expert can, with the approval of the tractor manufacturer, be used as a basis for the authority responsible to issue an exceptional approval according to § 70 of the German Regulations Authorising the Use of Vehicles for Road Traffic and the required approval according to § 29, paragraph 3 of the German Road Traffic Regulations.

7.1.1.1 Data required for the calculation

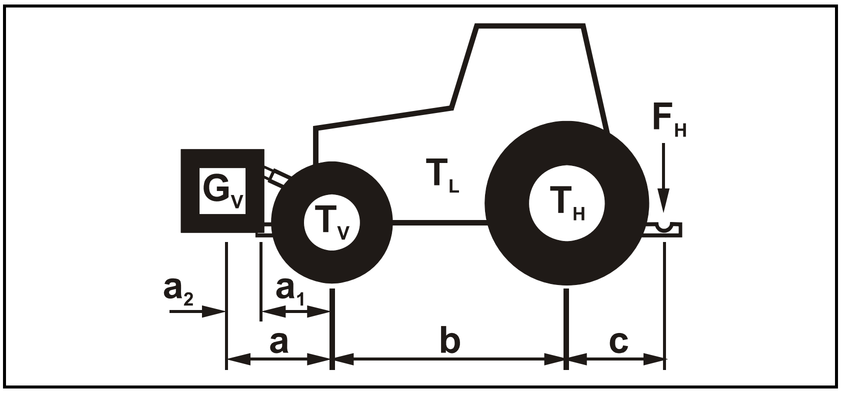


Fig. 110

T_L	[kg]	Tractor empty weight	See tractor operating manual or vehicle documentation
T_V	[kg]	Front axle load of the empty tractor	
T_H	[kg]	Rear axle load of the empty tractor	
G_V	[kg]	Front weight (if available)	See front weight in technical data, or weigh
F_H	[kg]	Maximum drawbar load	See technical data of machine
a	[m]	Distance between the centre of gravity of the front machine mounting or the front ballast and the centre of the front axle (total a_1 + a_2)	See technical data of tractor and front machine mounting or front ballast or measurement
a_1	[m]	Distance from the centre of the front axle to the centre of the lower link connection	See tractor operating manual or measurement
a_2	[m]	Distance between the centre of the lower link connection point and the centre of gravity of the front machine mount or front ballast (centre of gravity distance)	See technical data of front machine mounting or front ballast or measurement
b	[m]	Tractor wheel base	See tractor operating manual or vehicle documents or measurement
c	[m]	Distance between the centre of the rear axle and the centre of the lower link connection	See tractor operating manual or vehicle documents or measurement

7.1.1.2 Calculation of the required minimum ballasting at the front $G_{V\,min}$ of the tractor for assurance of the steering capability

$$G_{V\ \min} = \frac{F_H \bullet c - T_V \bullet b + 0{,}2 \bullet T_L \bullet b}{a + b}$$

Enter the numeric value for the calculated minimum ballast $G_{V\,min}$, required on the front side of the tractor, in the table (Section 7.1.1.7).

7.1.1.3 Calculation of the actual front axle load of the tractor $T_{V\,tat}$

$$T_{V\ tat} = \frac{G_V \bullet (a + b) + T_V \bullet b - F_H \bullet c}{b}$$

Enter the numeric value for the calculated actual front axle load and the approved tractor front axle load specified in the tractor operating manual in the table (Section 7.1.1.7).

7.1.1.4 Calculation of the actual total weight of the combined tractor and machine

$$G_{tat} = G_V + T_L + F_H$$

Enter the numeric value for the calculated actual total weight and the approved total tractor weight specified in the tractor operating manual in the table (Section 7.1.1.7).

7.1.1.5 Calculation of the actual rear axle load of the tractor $T_{H\,tat}$

$$T_{H\ tat} = G_{tat} - T_{V\ tat}$$

Enter the numeric value for the calculated actual rear axle load and the approved tractor rear axle load specified in the tractor operating manual in the table (Section 7.1.1.7).

7.1.1.6 Tyre load capacity

Enter the double value (two tyres) of the approved load capacity (see, for example, tyre manufacturer's documentation) in the table (Section 7.1.1.7).

7.1.1.7 Table

	Actual value according to calculation		Permissible value according to tractor operating manual		Double the permissible load capacity (two tyres)
Minimum ballast front / rear	/ kg		--		--
Total weight	kg	≤	kg		--
Front axle load	kg	≤	kg	≤	kg
Rear axle load	kg	≤	kg	≤	kg

- You can find the permissible values for the total tractor weight, axle loads and load capacities in the tractor registration papers.
- The actually calculated values must be less than or equal to (≤) the permissible values.

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through insufficient stability and insufficient tractor steering and brake power.

It is forbidden to couple the machine to the tractor used as the basis for calculation, if

- one of the actual, calculated values is greater than the permissible value.
- there is no front ballast (if required) attached to the tractor for the minimum front ballast ($G_{V\,min}$).

You must use a front weight, which is equal to at least the required minimum front ballast ($G_{V\,min}$).

7.1.2 Requirements for tractor operation with attached machines

WARNING

Risk of breakage during operation of components through unapproved combinations of connecting equipment.

- Ensure:
  - that the connection fitting on the tractor possesses a permissible drawbar load sufficient for the actual drawbar load.
  - that the axle loads and weights of the tractor altered by the drawbar load are within the approved limits. If necessary, weigh them.
  - that the tractor's actual static rear axle weight does not exceed the permissible rear axle weight.
  - that the permissible total weight of the tractor is observed
  - that the approved load capacities of the tractor tyres are not exceeded.

7.1.2.1 Combination options for connection fittings and towing eyes

Fig. 111 shows permitted combination options for joining the connection fitting on the tractor and the towing eye on the machine in relation to the maximum permitted drawbar load.

You will find the maximum permitted drawbar load in the vehicle documentation or on the rating plate on the connection fitting of your tractor.

Maximum permissible drawbar load	Connection fitting on the tractor	Towing eye on the fixed drawbar trailer
2000 kg	Pin coupling DIN 11028 / ISO 6489-2	Towing eye 40 for hydraulic high-lift drawbar DIN 11043
	Non-automatic pin coupling DIN 11025	
3000 kg - ≤ 40 km/h 2000 kg - > 40 km/h	Trailer hook (hitch hook) ISO 6489-1	Towing eye (hitch ring) ISO 5692-1
	Trailer peg (Piton-fix) ISO 6489-4	
	Ball coupling 80	Ball bracket 80

Fig. 111

7.1.2.2 Calculating the actual D_C value for the combination to be coupled

WARNING

Risk of breakage of the connection fitting between tractor and machine due to improper use of the tractor.

Calculate the actual D_C value for your combination, made up of tractor and machine, to check whether the connection fitting on your tractor displays the required D_C value. The actual calculated D_C value for the combination must be less than or equal to (≤) the given D_C value of the connection fitting of your tractor.

The actual D_C value of a coupling combination is calculated as follows:

$$D_C = g \times \frac{T \times C}{T + C}$$

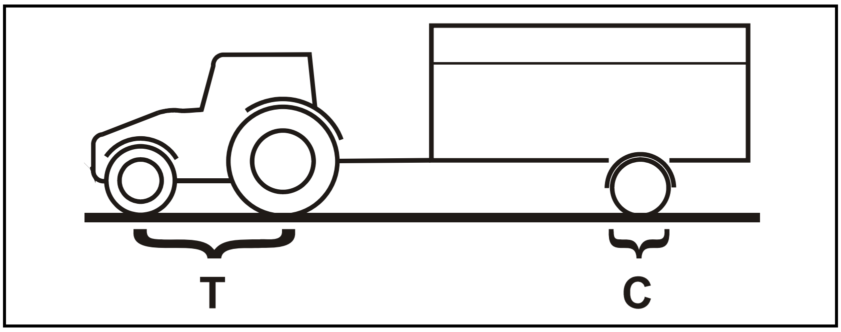


Fig. 112

T: Permissible total weight of your tractor in [t] (see tractor operating manual or vehicle documents)

C: Axle load of the machine loaded with the permitted mass (payload) in [t], without drawbar load

g: Acceleration due to gravity (9.81 m/s²)

Actual calculated D_C value for the combination		**D_C value given on the tractor for the connection fitting**
KN	≤	KN

You can find the D_C value for the connection fitting on the connection fitting itself / in the operating manual for your tractor.

7.1.3 Machines without their own brake system

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through inadequate brake power of your tractor.

The tractor must achieve the brake rate specified by the tractor manufacturer, even with the machine connected.

If the machine does not possess its own brake system:

- Then the actual tractor weight must be greater than or equal to (≥) the actual weight of the connected machines.

  In many countries, other regulations apply. In Russia, for example, the weight of the tractor must be double that of the attached machine.

- The maximum operational speed is 25 km/h.

7.2 Adjusting the length of the PTO shaft to the tractor

WARNING

Danger from

- **damaged and/or destroyed, flying parts for the operator / third party if the PTO shaft is compressed or pulls apart while the machine coupled to the tractor is being raised/lowered, because the length of the PTO shaft has not been adjusted properly.**
- **being caught and drawn in if the PTO shaft is installed incorrectly or if unauthorised design changes are made.**

Have the length of the PTO shaft checked in all operating positions by a specialist workshop and, if necessary, adjusted before coupling the PTO shaft to your tractor for the first time.

Always observe the operating manual supplied with the PTO shaft when adjusting the PTO shaft.

This adjustment of the PTO shaft applies only for the current tractor type. You may need to readjust the PTO shaft if you couple the machine to another tractor.

WARNING

Risk of being caught and drawn in if the PTO shaft is installed incorrectly or if unauthorised design changes are made.

Only a specialist workshop may make design changes to the PTO shaft. When doing so, read and follow the operating manual from the manufacturer.

Adjusting the length of the PTO shaft is permitted with consideration of the minimum profile overlap.

Design changes to the PTO shaft that are not described in the operating manual from the PTO shaft manufacturer are not permitted.

WARNING

Risk of crushing between the rear of the tractor and the machine when raising and lowering the machine to determine the shortest and longest operating position of the PTO shaft.

Only actuate the operator controls for the tractor's three-point linkage

- from the intended workstation.
- if you are outside of the danger area between the tractor and the machine.

WARNING

Risk of crushing from unintentional:

- **rolling of the tractor and the connected machine.**
- **lowering of the raised machine.**

Secure the tractor and machine from unintentionally starting or rolling and secure the raised machine against unintentional lowering before entering the danger zone between the tractor and raised machine in order to adjust the PTO shaft.

The PTO shaft is at its shortest when it is horizontal. The PTO shaft is at its longest when the machine is fully lifted.

1. Couple the tractor to the machine (do not connect the PTO shaft).
2. Apply the tractor's parking brake.
3. Determine the clearance height of the machine with the shortest and longest operating position for the PTO shaft.
    3.1 To do so, raise and lower the machine via the tractor's three-point hydraulic system.

    While doing so, actuate the manual controls for the tractor's three-point hydraulic system on the rear of the tractor, from the provided workstation.
4. Secure the machine, lifted in the measured clearance height, against unintentional lowering (for example, by supporting it or hooking it to a crane).
5. Secure the tractor from unintentional starting before entering the danger area between the tractor and machine.
6. When measuring the length and shortening the PTO shaft, read and follow the operating manual from the PTO shaft manufacturer.
7. Put the shortened halves of the PTO shaft back together.
8. Grease the universal joint shaft of the tractor and the gearbox input shaft before connecting the PTO shaft.

    The tractor symbol on the protective tube of the PTO shaft identifies the tractor-side connection of the PTO shaft.

7.3 Securing tractor / machine against accidental starting and rolling

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact when making interventions in the machine, through

- **unintentional falling of the unsecured machine raised using the tractor's three-point linkage.**
- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**
- Secure the tractor and the machine against unintentional start-up and rolling before making any intervention in the machine.
- It is forbidden to make any intervention in the machine, such as installation, adjustment, troubleshooting, cleaning, maintenance and repairs
  - when the machine is running
  - for as long as the tractor engine is running with a connected PTO shaft / hydraulic system.
  - when the ignition key is inserted in the tractor and the tractor engine with the connected PTO shaft / hydraulic system could be started unintentionally.
  - when the tractor and machine are not secured against unintentional rolling using their parking brakes and/or wheel chocks.
  - when moving parts are not locked against unintentional movement.

  When carrying out such work, there is a high risk of contact with unsecured components.

1. Lower the raised, unsecured machine / raised, unsecured parts of the machine.

→ This is how to prevent unintentional falling:

2. Shut down the tractor engine.
3. Remove the ignition key.
4. Apply the tractor's parking brake.
5. Secure the machine against unintentional rolling (only attached machine)
   - On flat ground using the parking brake (if present) or wheel chocks.
   - On uneven ground or slopes using the parking brake and wheel chocks.

7.4 Fitting wheels (Specialist workshop)

If the machine is fitted with inflatable spare tyres, running wheels must be fitted before putting into operation.

WARNING

Only one permitted set of tyres may be used, as specified in the technical data (see page 51).

Wheel rims that are suitable for the tyres used must have a rim that has been fully welded all the way round.

1. Lift machine slightly using lifting crane.

DANGER

Use the attachment points marked for lifting belts.

See also "Loading" section, page 37.

2. Loosen wheel nuts on the inflatable spare tyres.
3. Remove inflatable spare tyres.

CAUTION

Take care when removing the inflatable spare tyres and putting the running wheels in place.

4. Place the running wheels on threaded bolts.
5. Tighten wheel nuts.

Required tightening torque for wheel nuts: 510 Nm.

6. Lower machine and remove lifting belts.
7. After 10 operating hours, tighten wheel nuts.

7.5 Initial operation of service brake system

Perform a brake test while the trailed sprayer is empty, and again when it is loaded to test the braking behaviour of the tractor with coupled trailed sprayer.

We recommend that you have a specialist workshop coordinate the brakes on the tractor and trailed sprayer in order to attain optimum braking and minimum wear to brake linings (see "Maintenance" section, page 198).

7.6 Adjusting the system setting screw on the hydraulic block

- **Profi-folding only:**

The machine is not suitable for use with the ‘Load Sensing’ hydraulic system.

Always adjust the system setting screw to the hydraulic system on your tractor. Increased hydraulic fluid temperatures are the result of an incorrectly adjusted system setting screw, caused by constant strain on the tractor hydraulics pressure relief valve.

Fig. 113/...

(1) System converting bolt

(2) LS connection for load sensing control line

Fig. 114/...

(1) Tractor connection for load sensing control line

(2) Tractor connection for the load sensing pressure hose

(3) Tractor connection for the pressure-free return flow

The tractor hydraulic system available determines the setting of the system setting screw on the hydraulic block (Fig. 113/1).

Depending on the tractor hydraulic system, the system setting screw must be

- **screwed out** up to the stop (factory setting) on tractors with
  - open-centre hydraulic system (constant flow system, geared pump hydraulics).
  - setting pump with adjustable oil extraction via the control unit
- **screwed in** up to the stop (in contrast to the factory setting) on tractors with
  - closed-centre hydraulic system (constant pressure system, pressure regulated setting pump).
  - load-sensing hydraulic system (pressure and power controlled setting pump) with direct load-sensing pump connection. Using the flow control valve on the tractor, adjust the actual flow rate to the required flow rate.

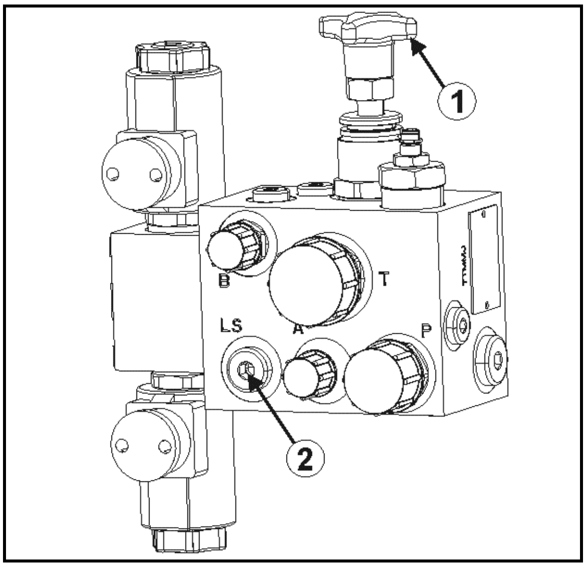


Fig. 113

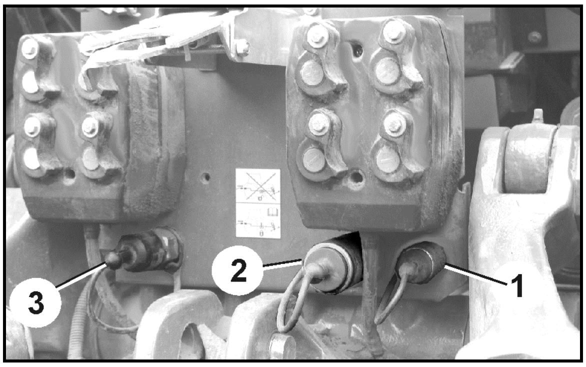


Fig. 114

- The machine must be depressurised before making adjustments.
- The hydraulic block can be found at the front on the right of the machine, behind the cover plate.

7.7 AutoTrail position encoder

If using AutoTrail drawbar, a holder for the position encoder (Fig. 115/1) must be fitted to the tractor.

The holder must be made according to the actual circumstances of the tractor with the sleeve with locking screw (Fig. 115/2) and metal plate (Fig. 115/3) provided.

When installed, the position encoder must be directly above the pivot point of the tractor pin coupling (Fig. 115/4).

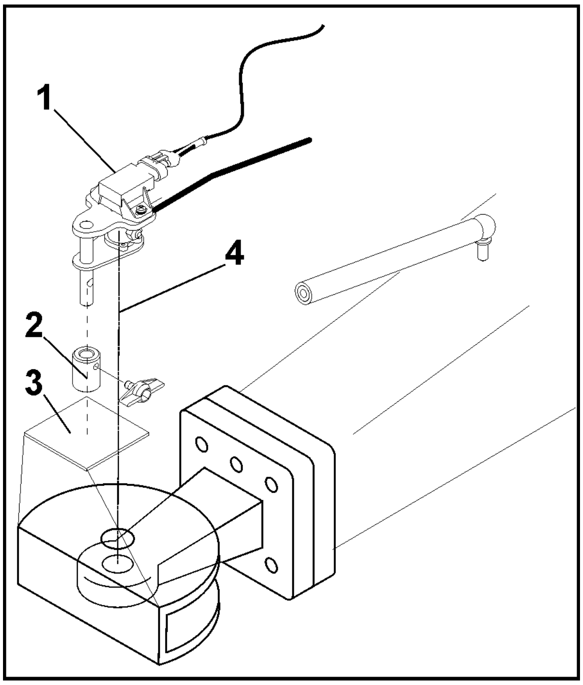


Fig. 115

- Keep the distance between the coupling point and position encoder (Fig. 116/ X) as small as possible (particularly with the hitch drawbar).
- In neutral position with the machine coupled, the rod of the position encoder must be pulled approximately 100 mm out of the holder.

  If necessary, fasten the holder in an alternative position.

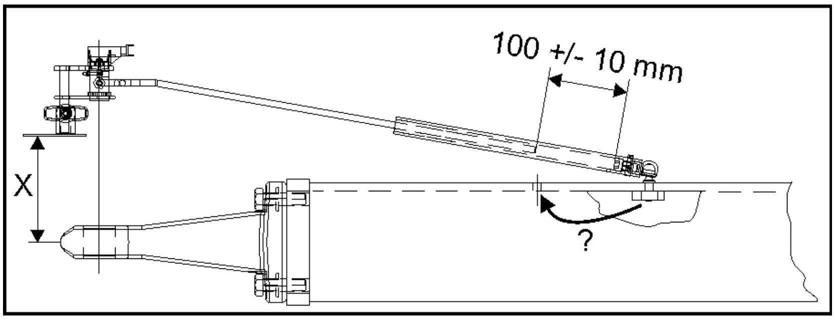


Fig. 116

7.8 Track setting (Specialist workshop)

	Axle	braked				unbraked			
	Impression depth of wheels[mm]	+100	-100	+130	-130	+100	-100	+130	-130
Track width [mm]	Min.	**1540**	**1950**	**1480**	**2000**	**1470**	**1750**	**1530**	**1800**
	Max.	**2050**	**2450**	**1990**	**2510**	**1960**	**2360**	**1900**	**2420**

Set the wheelmark spacing of the machine so that the wheels of the sprayer run in the middle of the **tractor** wheel tracks.

The track width can be infinitely variably adjusted.

The adjustable track widths depend on the impression depth and the wheel assembly:

Tighten the wheel bolts to tightening torque 450 Nm.

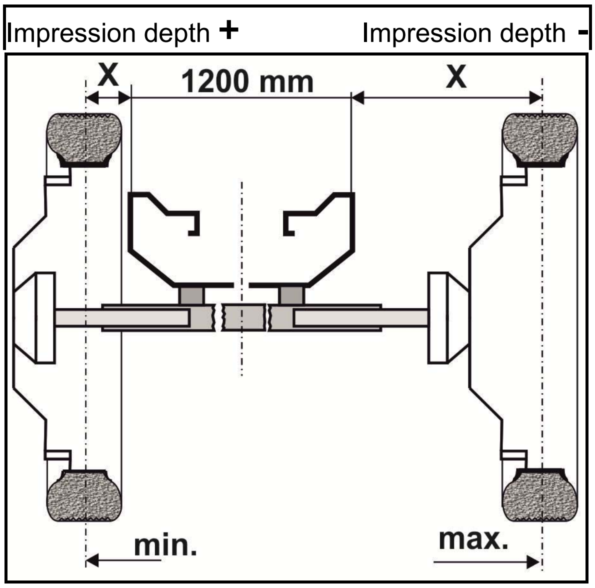


Fig. 117

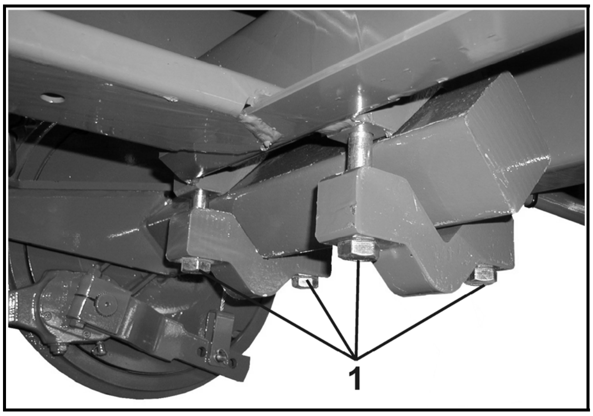


Fig. 118

Carry out wheelmark spacing adjustment as follows:

1. Attach the sprayer to the **tractor**.
2. Apply the **tractor's** parking brake.
3. Secure the sprayer against rolling away with chocks.
4. Raise the sprayer on one side with a jack until the respective wheel is raised from the ground.

Warning!

Position the jack on the sprayer frame, not on the axle!

5. Release the clamping screws (Fig. 118/1).
6. Extend or retract the axle half to the desired position. For this purpose, determine dimension "x" from the outer edge of the base frame (Fig. 117/1) to the centre of the sprayer wheel and extend or retract the axle half accordingly..

$$X = \frac{\text{Desired wheelmark spacing [mm]} - 1.200\ \text{[mm]}}{2}$$

7. Tighten the clamping screws to tightening torque **410 Nm** for M 20 screws.
8. Extend or retract the axle half on the opposite side in the same way.

7.9 Adjusting the steering geometry for track follow drawbar or universal drawbar to the tractor (Specialist workshop)

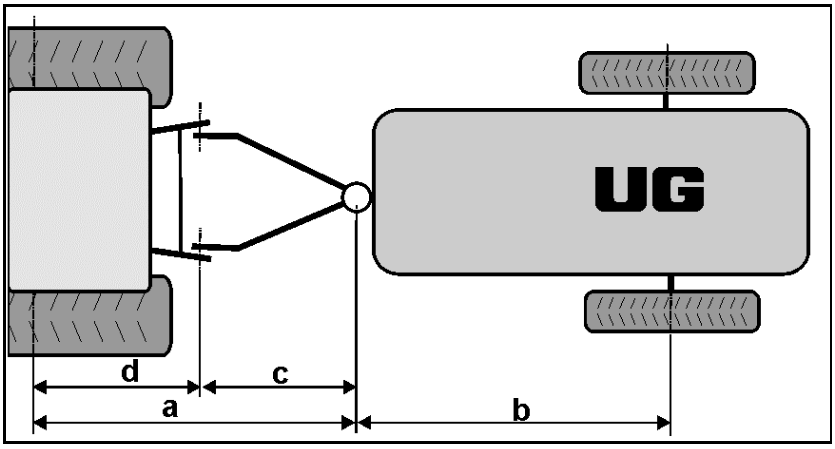


Fig. 119

(a) Distance between the tractor's rear axle and the pivot point of the drawbar:

(b) Distance between the machine's axle and the pivot point of the drawbar.

(c) Distance between the pivot point and lower link connection of the drawbar.

(d) Distance between the centre of the tractor's rear axle and the tractor's lower link connection.

Exact as possible track follow-up of the sprayer behind the tractor is achieved if the pivot point of the drawbar is exactly in the centre between the tractor's rear axle (Fig. 119/2) and the machine's axle.

→ a = b

For this purpose, the distance **"c"** between the pivot point and the lower link connections is adjustable as follows:

- with the track follow drawbar from 1020 to 1260 mm (4 x in steps of 80 mm).
- with the universal drawbar from 1100 to 1260 mm (3 x in steps of 80 mm).

Adjust the steering geometry of a non-installed machine placed on the stand as follows:

1. Determine the dimension **"c"** to be set between the pivot point and the lower link connection of the drawbar:

→ c = a - d

2. Release and remove the securing screws.
3. Screw on the lower link arms or drawbar as per distance **c**.
4. Tighten the securing screws to tightening torque:

- 360 Nm with M 20 **screws**,
- 450 Nm with M 22 **screws**.

8 Coupling and uncoupling the machine

When coupling and decoupling the machine, comply with the section "Safety information for the user", page 27.

WARNING

Risk of crushing from unintentional starting and rolling of the tractor and machine when coupling or uncoupling the machine.

When coupling or decoupling the machine, secure the tractor and machine against unintentional start-up and rolling before entering the danger area between the tractor and machine; refer to page 135.

WARNING

Risk of crushing between the rear of the tractor and the machine when coupling and uncoupling the machine.

Only actuate the operator controls for the tractor's three-point linkage

- from the intended workstation.
- if you are outside of the danger area between the tractor and the machine.

8.1 Coupling the machine

WARNING

Risk of breaking during operation, insufficient stability and insufficient tractor steering and braking power from improper use of the tractor.

You may only connect the machine to tractors suitable for this purpose. Refer to the section "Checking the suitability of the tractor", page 127.

WARNING

Risk of crushing when coupling the machine and standing between the tractor and the machine.

Instruct people to leave the danger area between the tractor and the machine before you approach the machine.

Any helpers may only act as guides standing next to the tractor and the machine, and may only move between the vehicles when both are at a standstill.

WARNING

Risk of contusions, cutting, catching, drawing in and knocks when the machine unexpectedly releases from the tractor!

- Use the intended equipment to connect the tractor and the machine in the proper way.
- When coupling the machine to the tractor's three-point hydraulic system, ensure that the attachment categories of the tractor and the machine are the same.
  You must upgrade the machine's cat. II upper and lower links to cat. III with the aid of adapter sleeves if your tractor has a cat. III three-point hydraulic system.
- Only use the upper and lower link pins provided for coupling the machine.
- Check the upper and lower link pins for visible defects whenever the machine is coupled. Replace the upper and lower link pins in the event of clearly visible wear.
- Secure the upper link pin and lower link pin in the attachment points of the three-point attachment frame against unintentional detachment using a linchpin.
- Perform a visual inspection to ensure that the upper and lower link hooks are correctly locked before reversing the tractor.

WARNING

Risk of energy supply failure between the tractor and the machine due to damaged power supply lines.

During coupling, check the course of the power supply lines. The power supply lines

- must give slightly to all movement of the connected machine without tensioning, kinking or rubbing.
- must not chafe against other parts.

CAUTION

Lower link hitch:
Damage to the PTO shaft when braking suddenly after driving in reverse because the machine bangs up.

Secure the lower link connection upwards to prevent a release.

1. Direct people away from the danger area between the tractor and machine before you approach the machine with the tractor.
2. Couple the supply lines first before coupling the machine with the tractor.
   - 2.1 Drive the tractor up to the machine, leaving a clearance of approximately 25 cm between tractor and machine.
   - 2.2 Secure the tractor against unintentional starting and unintentional rolling.
   - 2.3 Check whether the universal joint shaft of the tractor is switched off.
   - 2.4 Couple the PTO shaft and supply lines with the tractor.
   - 2.5 Hydraulic brake: fasten the parking brake pulling cable to the tractor.
3. Now reverse the tractor towards the machine so that the connection fitting can be coupled.
4. Couple the connection fitting.
5. Lift the stand into transport position.
6. Remove wheel chocks, release parking brake.

When driving the tractor with the machine coupled round a curve for the first time, make sure that no tractor attachments collide with the machine:

8.2 Uncoupling the machine

WARNING

Risk of crushing, cutting, being caught or drawn in, or impact through inadequate stability and tipping over of the uncoupled machine.

Park the empty machine on a horizontal space with a hard surface.

When uncoupling the machine, there must always be enough space in front of the machine so that you can align the tractor with the machine if necessary.

1. Park the empty machine on a horizontal space with a hard surface.
2. Uncouple the machine from the tractor.
   2.1 Secure the machine against unintentionally rolling. See page 135.
   2.1 Lower the stand to the parking position.
   2.2 **Un**couple the connection fitting.
   2.3 Draw the tractor forwards by approximately 25 cm.
   → The space created between the tractor and the machine allows better access for decoupling the PTO shaft and the power supply lines.
   2.4 Secure the tractor and machine against unintentional starting and unintentional rolling.
   2.5 Decouple the PTO shaft.
   2.6 Place the PTO shaft in the holder.
   2.7 Uncouple the supply lines.
   2.8 Fasten the supply lines in the corresponding parking sockets.
   2.9 Hydraulic brake: detach parking brake pulling cable from tractor.

8.2.1 Manoeuvring the uncoupled machine

DANGER

You must be particularly careful when shunting the machine with the service brake system released, since only the manoeuvring vehicle is now braking the trailed sprayer.

The machine must be connected to the manoeuvring vehicle before you actuate the release valve on the trailer brake valve.

The manoeuvring vehicle must be braked.

The service brake system cannot be released using the release valve if the air pressure in the air reservoir drops below 3 bar (e.g. if the release valve has been actuated multiple times or if there are leaks in the brake system).

To release the service brake

- fill the air reservoir.
- Remove all air from the braking system at the drain valve on the air reservoir.

1. Connect the machine to the manoeuvring vehicle.
2. Brake the manoeuvring vehicle.
3. Remove the wheel chocks and release the parking brake.
4. **pneumatic braking system** only:

   4.1 Press the actuator button on the release valve as far as it will go (see page 67).

→ The service brake system is released and the machine can be manoeuvred.

   4.2 Once the manoeuvring procedure is finished, pull out the actuator button on the release valve as far as it will go.

→ The pressure from the air reservoir brakes the trailed sprayer again.

5. Actuate the brakes on the manoeuvring vehicle again once you have finished manoeuvring the machine.
6. Tighten the parking brake again and secure the machine against rolling with wheel chocks.
7. Uncouple the machine and manoeuvring vehicle.

9 Transportation

- During transportation, follow the instructions given in the section "Safety instructions for the operator", page 29.
- Before moving off, check:
    - that the supply lines are connected correctly.
    - the lighting system for damage, proper operation and cleanliness,
    - the braking and hydraulic systems for obvious defects.
    - that the parking brake is completely released
    - the function of the brake system

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact when making interventions in the machine, through unintentional machine movements.

- On foldable machines, check that the transport locks are correctly locked.
- Secure the machine against unintentional movements before starting transportation.

WARNING

Risk of crushing, cutting, being caught and/or drawn in, or impact from tipping and insufficient stability.

- Drive in such a way that you always have full control over the tractor with the attached machine.

  In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected machine.
- Before transportation, fasten the side locking device of the tractor lower link, so that the connected or coupled machine cannot swing back and forth.

WARNING

Risk of breaking during operation, insufficient stability and insufficient tractor steering and braking power from improper use of the tractor.

These risks pose serious injuries or death.

Comply with the maximum load of the connected machine and the permissible axle and drawbar loads of the tractor. If necessary, drive only with a partially filled tank.

WARNING

Risk of falling when riding on the machine, contrary to instructions.

It is forbidden to ride on the machine and/or climb the machine while it is running.

Instruct people to leave the loading site before approaching the machine.

CAUTION

- During transportation, follow the instructions given in the section "Safety instructions for the operator", page 29.
- Transportation while AutoTrail is switched on is prohibited.
- Transportation is prohibited with a locked control unit. As a general rule, put the control unit on the tractor into neutral for transportation.
- **Move the sprayer boom to the transport position and secure mechanically.**

→ **If a working width reduction of the outer elements is mounted, unfold it for transporting purposes.**

- Use the transport safety catch to secure the induction bowl when it has been swivelled up into its transport position to prevent it from swivelling down again accidentally.
- Securing elements engage in the catching hooks and secure the ladder in the transport position against unintentional lowering.
- If a boom extension (option) is mounted, move it into the transport position.
- Switch the work lights off during transport to avoid blinding other motorists.

WARNING

Risk of accident from the machine tipping over or unstable machine driving behaviour!

- Set the steering drawbar to central position (drawbar flush with machine longitudinal axis).
- Secure steering drawbar by closing the stop tap in position **0**.
- Attach the universal drawbar by securing the fixing bar / the hydraulic cylinder between the machine and drawbar.

Otherwise there is the risk of the machine tipping over!

10 Using the machine

When using the machine, observe the information in the following sections:

- "Warning symbols and other labels on the machine" starting on page 18 and
- "Safety information for the user", starting on page 27 ff.

Observing this information is important for your safety.

WARNING

Risk of breaking during operation, insufficient stability and insufficient tractor steering and braking power from improper use of the tractor.

Comply with the maximum load of the connected machine and the permissible axle and drawbar loads of the tractor. If necessary, drive only with a partially filled tank.

WARNING

Risk of crushing, cutting, being caught and/or drawn in, or impact through insufficient stability and tipping of the tractor and/or the attached machine.

Drive in such a way that you always have full control over the tractor, whether the machine is attached or unattached.

In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the connected machine.

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through

- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**

Secure the tractor and the machine against unintentional start-up and rolling before eliminating faults on the machine. See page 135.

Wait for the machine to stop before entering the machine danger area.

WARNING

Danger for the operator or third parties from damaged components being ejected due to impermissibly high drive speeds of the tractor universal joint shaft.

Observe the permissible machine drive speed before switching on the tractor universal joint shaft.

WARNING

Risk of being caught and drawn in and danger from foreign objects being caught and thrown out in the danger area of the driven PTO shaft.

- Whenever the machine is used, first check to ensure that the safety devices and guards of the PTO shaft are fully intact and functional.

  Have damaged safety devices and guards of the PTO shaft replaced immediately by a specialist workshop.
- Check that the PTO shaft guard is secured against rotation by the supporting chain.
- Maintain a sufficient safety clearance between you and the driven PTO shaft.
- Direct people out of the danger area of the driven PTO shaft.
- Shut down the tractor engine immediately in case of danger.

WARNING

Risk of accidental contact with crop protection agents / spray liquid.

- Wear personal protective equipment
  - when preparing the spray liquid.
  - when cleaning / replacing the spraying nozzles during spraying operation.
  - for all cleaning work carried out on the field sprayer after spraying operation.
- When wearing the required protective clothing, always observe the manufacturer's instructions, the product information, the user manual, the safety datasheet or the operating manual for the crop protection agent to be used. For example, use:
  - Chemical-resistant gloves
  - Chemical-resistant overalls
  - Water-resistant footwear
  - A face mask
  - Breathing apparatus
  - Safety glasses
  - Skin protection agents, etc.

WARNING

Risk to health from accidental contact with crop protection agents or spray liquid.

- Put on protective gloves before
  - using crop protection agent,
  - carrying out work on a contaminated field sprayer or
  - cleaning the field sprayer.
- Wash the gloves with clear fresh water from the fresh water tank
  - immediately after contact with crop protection agent.
  - before removing the gloves.

- To use AutoTrail, open the stop tap on the hydraulic cylinder.

10.1 Preparing for spraying operation

- The field sprayer must be operating properly in order to guarantee correct application of the crop protection agent. Have the field sprayer tested regularly on a test rig. Rectify any deficiencies immediately.
- Make sure of using the correct filter equipment, see page 92
- Clean the field sprayer thoroughly before spreading a different crop protection agent.
- Flush the nozzle line before:
  - each time changing a nozzle.
  - before rotating the multiple-nozzle head to another nozzle.

  See the section on "Cleaning", page 188
- Fill the flushing water tank and the clear water tank.

10.2 Preparing the spray liquid

WARNING

Risk of accidental contact with crop protection agent and/or spray liquid.

- Always induct the crop protection agent into the spray liquid tank using the induction bowl.
- Swivel the induction bowl into the filling position before pouring in crop protection agent.
- Observe the safety regulations on physical protective equipment and breathing apparatus for use when handling crop protection agent and preparing the spray liquid, in the instructions for use of the crop protection agent.
- Do not prepare the spray liquid in the vicinity of wells or surface water.
- Avoid leaks and contamination with crop protection agent and/or spray liquid through appropriate conduct and wearing appropriate physical protection equipment.
- To avert risks to third parties, do not leave the prepared spray liquid, unused crop protection agent or used crop protection agent canisters and the uncleaned field sprayer unattended.
- Protect contaminated crop protection agent canisters and the contaminated field sprayer from precipitation.
- During and after preparing the spray liquid, ensure sufficient cleanliness in order that risks may be kept as low as possible (e.g. thoroughly wash used gloves before removing them and dispose of the washing water and cleaning fluid in the proper manner).

- The prescribed water and agent spray rate can be found in the directions for use for the crop protection agent.
- Read the directions for use for the agents and observe the specified precautions.

WARNING

Danger for people and animals from accidental contact with spray liquid while filling of the spray liquid tank is underway.

- Wear personal protective equipment when handling crop protection agent / dumping spray liquid from the spray liquid tank. The type of personal protective equipment required depends on the manufacturer's instructions, the product information, the directions for use, the safety datasheet or the user manual for the crop protection agent in question.
- Never leave the field sprayer unattended during filling.
  - Never fill the spray liquid tank beyond the nominal volume.
  - When filling the spray liquid tank, never exceed the permissible load of the field sprayer. Pay attention to the respective specific weight of the liquid in question.
  - During filling, always watch the fill level indicator to avoid overfilling the spray liquid tank.
  - Pay particular attention while filling the spray liquid tank to sealed surfaces; no spray liquid may be allowed to get into the sewerage system.
- Before each filling, check the field sprayer for damage, e.g. for leaking tanks and hoses, as well as for the correct positioning of all control elements.

During filling, pay attention to the permissible load capacity for your field sprayer. Always take into account, when filling your field sprayer, the differing specific weights [kg/l] for individual liquids.

Specific weights of different liquids

Liquid	Water	Urea	UAN	NP solution
Density [kg/l]	**1**	**1.11**	**1.28**	**1.38**

Control terminal:

In the **control terminal**, call up the filling display from the Job menu.

- As it is difficult to dispose of residues in an environmentally-friendly manner, carefully calculate the required filling quantity or re-fill quantity to avoid leaving any residue at the end of spraying operation.
    - To calculate the required re-fill quantity for topping up the spray liquid tank, use the "Filling table for remaining spray area". To do this, subtract the technical, undiluted residue in the sprayer boom from the calculated re-fill quantity.

      Refer to the section "Filling table for remaining areas" page157.

Method

1. Determine the required water and agent spray rate by consulting the directions for use of the crop protection agent.
2. Calculate the filling quantity or refill quantity for the area to be treated.
3. Fill the machine and blend in the agent.
4. Agitate the spray liquid before commencing spraying operations in accordance with the instructions of the spraying agent manufacturer.

Fill the machine preferably using a suction hose and blend in the agent while filling.

The induction area is thereby flushed with water constantly.

- During the filling process, start blending in the agent once the tank filling level has reached more than 20%.
- When using more than one agent:
    - Clean the canister immediately after each induction of an agent.
    - Flush the induction port after each induction of an agent.

- When filling, no foam must escape from the spray liquid tank.

  The addition of a froth-inhibiting agent also prevents the spray liquid tank from frothing over.

The agitators normally remain switched on from the initial filling to the end of the spraying operation. The instructions of the agent manufacturer, however, have priority.

- With the agitator running, feed the water-soluble plastic film bag directly into the spray liquid tank.
- Before spraying, fully dissolve the urea by circulating the liquid. When dissolving large quantities of urea, the temperature of the spray liquid falls more sharply; the urea consequently dissolves more slowly. The warmer the water, the faster and more completely the urea can dissolve.

- Carefully wash the empty agent canisters, render them unusable, collect and dispose of them in a proper manner. Do not re-use them for other purposes.
- If only spray liquid is available for washing the agent canisters, first use this to carry out preliminary cleaning. Then wash them meticulously when clear fresh water is available, e.g. before preparing the next load for the spray liquid tank or when diluting the residue from the last load.
- Carefully wash out the empty agent tank (e.g. using canister flushing) and add the flushing water to the spray liquid!

To prevent limescale, the degree of hardness of the water may not exceed 14°dH (German degrees of hardness)!

10.2.1 Calculating the filling and re-fill quantity

To calculate the required re-fill quantity for final filling of the spray liquid tank use the "Filling table for remaining spray area", page 157.

Example 1:

The following are given:

Tank nominal volume	3000 l
Residue in the tank	0 l
Water consumption	400 l/ha
Agent required per ha	
Agent A	1.5 kg
Agent B	1.0 l

Question:

How many litres of water, how many kg of Agent A and how many litres of Agent B must be used to treat a surface of 2.5 ha in area?

Answer:

Water:	400 l/ha	x	2.5 ha	=	1000 l
Agent A	1.5 kg/ha	x	2.5 ha	=	3.75 kg
Agent B	1.0 l/ha	x	2.5 ha	=	2.5 l

Example 2:

The following are given:

Tank nominal volume	3000 l
Residue in the tank	200 l
Water consumption	500 l/ha
Recommended concentration	0.15 %

Question 1:

How many litres or kg of agent are needed to fill the tank?

Question 2:

How large is the area to be treated in ha if a residue of 20 l remains in the tank after spraying?

Formula and answer to Question 1:

$$\boxed{\frac{\text{Refill amount of water [l] x Concentration [\%]}}{100} \quad = \quad \text{Addition of agent[l or kg]}}$$

$$\frac{\text{(3000 – 200) [l] x 0.15 [\%]}}{100} \quad = \quad \text{4.2 [l or kg]}$$

Formula and answer to Question 2:

$$\boxed{\frac{\text{Quantity of liquid available [l] – Residue [l]}}{\text{Water consumption [l/ha]}} \quad = \quad \text{Area to be treated [ha]}}$$

$$\frac{\text{3000 [l] (tank nominal volume) – 20 [l] (residue)}}{\text{500 [l/ha] Water consumption}} \quad = \quad \text{5,96 [ha]}$$

10.2.2 Filling table for remaining spray area

To calculate the required re-fill quantity for final filling of the spray liquid tank use the "Filling table for remaining spray area". Deduct the residue in the spray line from the calculated re-fill quantity. See "Spray lines" section, page 112.

The specified re-fill quantities apply for a spray rate of 100 l/ha. For other spray rates, the re-fill quantity increases by a multiple.

Distance travelled [m]	Re-fill quantities [l] for sprayer booms with working widths [m] of													
	15	**16**	**18**	**20**	**21**	**24**	**27**	**28**	**30**	**32**	**33**	**36**	**39**	**40**
10	2	2	2	2	2	2	3	3	3	3	3	4	4	4
20	3	3	4	4	4	5	5	6	6	6	7	7	8	8
30	5	5	5	6	6	7	8	8	9	10	10	11	11	12
40	6	7	7	8	8	10	11	11	12	13	13	14	15	16
50	8	8	9	10	11	12	14	14	15	16	17	18	19	20
60	9	10	11	12	13	14	16	17	18	19	20	22	23	24
70	11	11	13	14	15	17	19	20	21	22	23	25	27	28
80	12	13	14	16	17	19	22	22	24	26	26	29	30	32
90	14	15	16	18	19	22	24	25	27	29	30	32	34	36
100	15	16	18	20	21	24	27	28	30	32	33	36	38	40
200	30	32	36	40	42	48	54	56	60	64	66	72	74	80
300	45	48	54	60	63	72	81	84	90	96	99	108	114	120
400	60	64	72	80	84	96	108	112	120	128	132	144	152	160
500	75	80	90	100	105	120	135	140	150	160	165	180	190	200

Fig. 120

10.3 Filling with water

WARNING

Danger for people and animals from accidental contact with spray liquid while filling of the spray liquid tank is underway.

- When filling the spray liquid tank using a mains water supply, never allow the filling hose and the contents of the spray liquid tank to come into direct contact. This is the only way to prevent spray liquid from being sucked or pushed into the mains supply.

→ Secure the end of the filling hose at least 10 cm above the filling opening on the spray liquid tank. The free flow which this creates offers the absolute maximum levels of safety against the backflow of spray liquid into the mains water supply.

- Avoid the formation of froth. No froth should escape from the spray liquid tank during filling. A large-cross-section funnel extending down the base of the spray liquid tank is an effective obstacle to the formation of froth.
- Only fill the spray liquid tank using a used filling sieve.

The least dangerous way is to carry out filling at the side of the field from the water tank (where possible making use of the natural lie of the land). Depending on the type of spraying agent used, this type of filling is not permitted in water protection zones. Always enquire with the "low water authority".

10.3.1 Filling the spray liquid tank via the filling opening

1. Determine the precise water filling quantity (refer to the section "Calculating the filling quantity or re-fill quantity", page 155).
2. Open the hinged/screw lid on the filling opening.
3. Fill the spray liquid tank via the filling opening with a "free flow" from the mains water supply.
4. Always pay attention to the fill level indicator during filling.
5. At the latest, you should stop filling the spray liquid tank
    - when the pointer on the fill level indicator reaches the fill limit mark.
    - before the field sprayer's authorised load is exceeded by the quantity of liquid poured in.
6. Close the filling opening properly using the hinged/screw lid.

10.3.2 Filling the spray liquid tank via the suction port on the control terminal

Please observe the relevant instructions when filling the spray liquid tank via the suction hose from public water points (please also see the section "Use of the machine", page 152).

- When filling, keep the cover open to allow the pressure to equalise!
- Always pay attention to the fill level indicator during filling.
- At the latest, you should stop filling the spray liquid tank
  - when the pointer on the fill level indicator reaches the fill limit mark.
  - before the field sprayer's authorised load is exceeded by the quantity of liquid poured in.

Fig. 121/...

1. Connect the suction hose to the filling connection.
2. Place the suction hose in the extraction point.
3. Move switch tap **D** (optional) to the position.
4. Move switch tap **B** to the position.
5. Move switch tap **A** to the position.
6. Run the pump.
7. If the tank is full

   7.1 Remove the suction hose from the extraction point so that the pump is able to suck up all remaining liquid in the suction hose.

   7.2 Switch tap **A** in position
8. Close the filling opening properly using the hinged/screw lid.

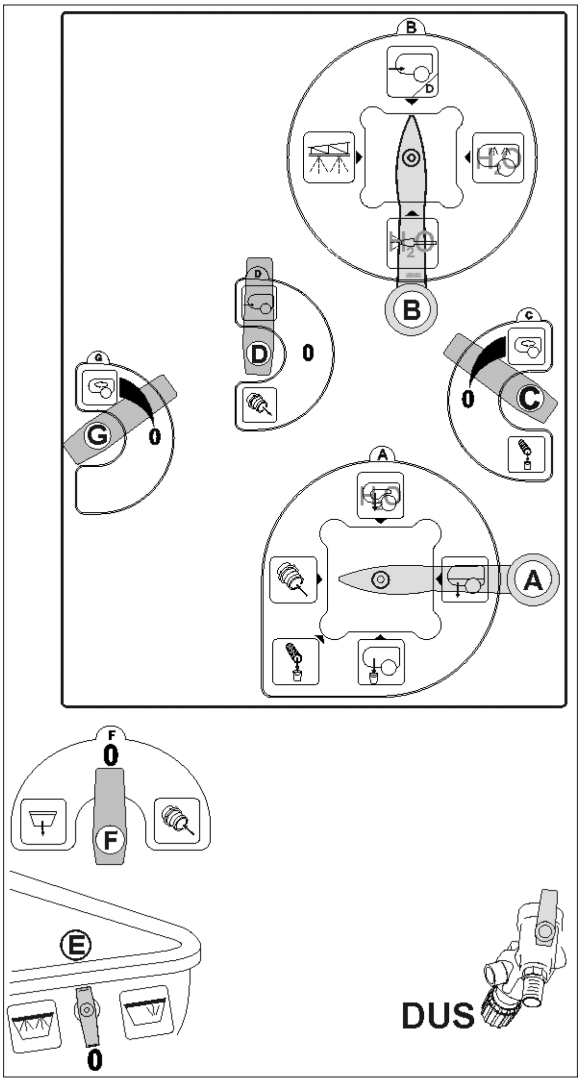


Fig. 121

Increasing the suction power by cutting in the injector:

Switch tap **F** in position .

The injector must not be cut in until the pump has drawn in water.

- The water being sucked via the injector does not flow through the suction filter.
- Comfort equipment with filling stop: The auxiliary injector must not be switched on, otherwise the automatic filling stop will not work.

First of all, place suction chest lever **A** in position then, if the suction hose has not been removed from the water extraction point, uncouple the suction hose from the suction port.

The total suction power is 500 l/min. (Pump 250l/min., injector 250 l/min.).

10.4 Filling the fresh water tank

WARNING

Unauthorised contamination of the fresh water tank with crop protection agent or spray liquid.

Only fill the fresh water tank with clear fresh water, never with crop protection agent or spray liquid.

When using the field sprayer, ensure that there is always an adequate supply of clear fresh water. When filling the spray liquid tank, also check and fill the fresh water tank.

10.5 Inducting agents

DANGER

While inducting agents, wear appropriate protective clothing as prescribed by the crop protection agent manufacturer.

The agitators normally remain switched on from filling to the end of spraying operation. On this account, the instructions of the agent manufacturer are decisive.

With the agitator running, insert the water-soluble plastic film bag straight into the spray liquid tank.

Induct the respective **agent via the induction bowl** (Fig. 122/1) into the water of the spray liquid tank. A distinction is drawn here between the induction of agents in liquid and powder form and of urea.

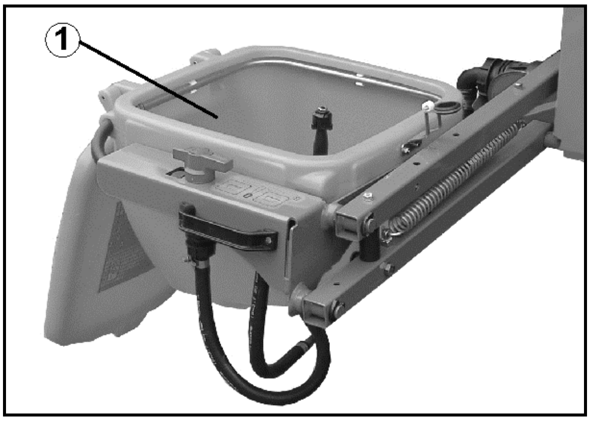
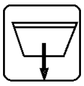
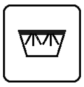
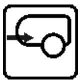
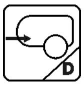
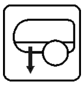


Fig. 122

10.5.1 Inducting liquid agents

Fig. 123/...

1. Fill the spray liquid tank halfway with water.
2. Move switch tap **F** to the  position.
3. Move switch tap **E** to the  position.
4. Move switch tap **D** (optional) to the  position.
5. Move switch tap **B** to the  position.
6. Move switch tap **A** to the  position.
7. **UG Super**: Switch on agitator **G:**
8. Open the induction bowl lid.
9. Pour the quantity of agent calculated and measured for filling the tank into the induction bowl (max. 60 l).
10. Run the pump at approx. 400 rpm.

→ Fully evacuate the contents from the induction bowl.

11. Move switch tap **E** to position **0**.
12. Move switch tap **F** to position **0**.
13. Close the induction bowl lid.
14. Top up with water.

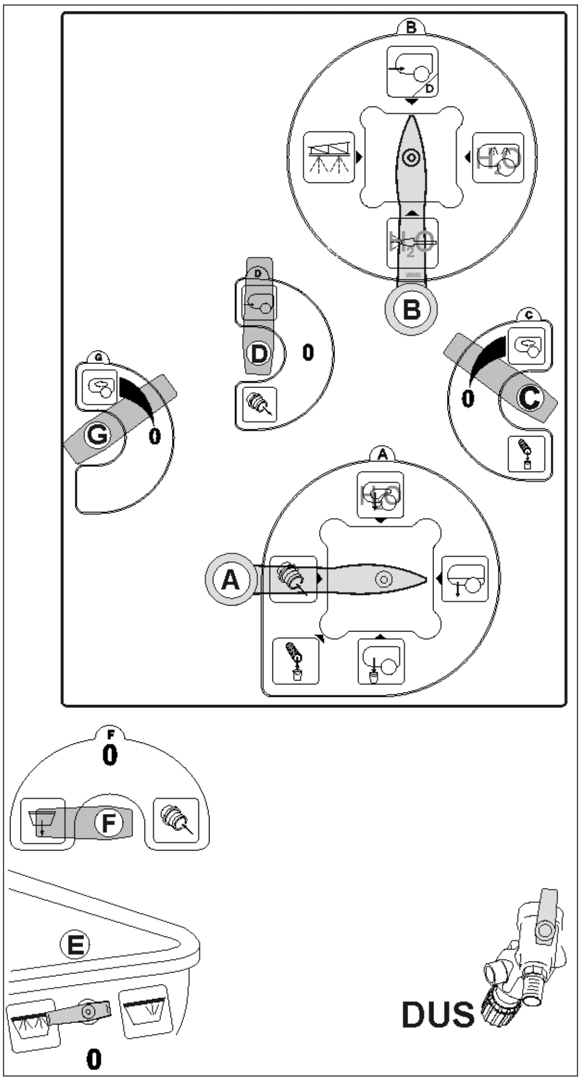
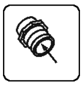


Fig. 123

For simultaneous filling of the spray liquid tank via the suction port on the control terminal:

Move switch tap **A** to the  position

10.5.2 Inducting agents in powder form and urea

Before spraying, fully dissolve the urea by circulating liquid. When dissolving large quantities of urea, the temperature of spray liquid will fall more sharply, meaning that the urea will only dissolve slowly. The warmer the water, the faster and more completely the urea will dissolve.

Fig. 124/...

1. Fill the spray liquid tank halfway with water.
2. Move switch tap **F** to position **0**.
3. Move switch tap **E** to position **0**.
4. Move switch tap **D** (optional) to the position.
5. Move switch tap **B** to the position.
6. Move switch tap **A** to the position.
7. UG Super: Switch on agitator **G:**
8. Open the induction bowl lid.
9. Pour the quantity of agent or urea calculated and measured for filling the tank into the induction bowl (max. 60 l).
10. Run the pump at approx. 400 rpm.
11. Move switch tap **E** to the position. Pump liquid through the induction bowl, until its contents have fully dissolved.
12. When the agent has fully dissolved, move switch tap **F** to the position until the contents have been fully evacuated from the induction bowl.
13. Move switch tap **E**, **F**, to position **0**.
14. Close the induction bowl lid.
15. Top up with water.

For simultaneous filling of the spray liquid tank via the suction port on the control terminal:

Move switch tap **A** to the position

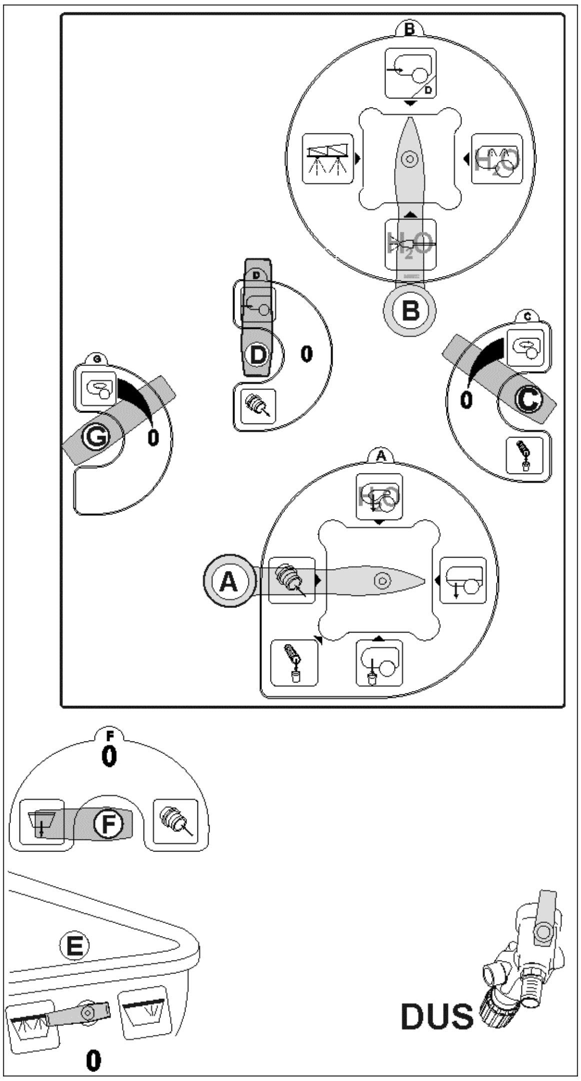


Fig. 124

10.5.3 Preliminary cleaning of the canister using spray liquid

Fig. 125/...

1. Move switch tap **F** to position **0**.
2. Move switch tap **E** to position **0**
3. Move switch tap **D** (optional) to the position.
4. Move switch tap **B** to the position.
5. Move switch tap **A** to the position.
6. Open the induction bowl lid.
7. Run the pump at approx. 400 rpm.
8. Wash the canister or other containers using canister flushing.

   Move switch tap **E** to the position.
9. Press the canister down for at least 30 secs and wash it.
10. Move switch tap **E** to position **0** and remove canister.
11. Move switch tap **F** to the position until the contents have been fully evacuated from the induction bowl.

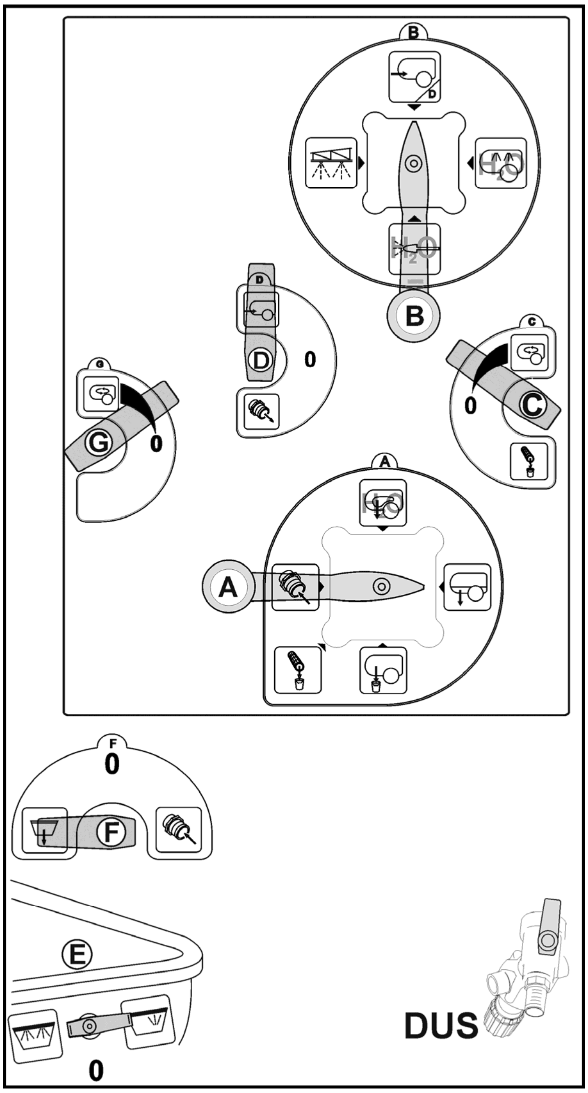


Fig. 125

10.5.4 Cleaning the canister with flushing water

Cleaning the canister with flushing water dilutes the concentration of the spray liquid.

Fig. 126/...

1. Move switch tap **F** to position **0**.
2. Move switch tap **E** to position **0**.
3. Move switch tap **D** (optional) to position **0**.
4. Move switch tap **B** to the D position.
5. Move switch tap **A** to the H_2O position.
6. UG Super: Switch on agitator **G:**
7. Open the induction bowl lid.
8. Run the pump at approx. 400 rpm.
9. Wash the canister or other containers using canister flushing.

   Move switch tap **E** to the position.
10. Press the canister down for at least 30 secs and wash it.
11. Move switch tap **E** to position **0** and remove canister.
12. Move switch tap **A** to the position.
13. Move switch tap **D** to the position.
14. Move switch tap **F** to the position until the contents have been fully evacuated from the induction bowl.

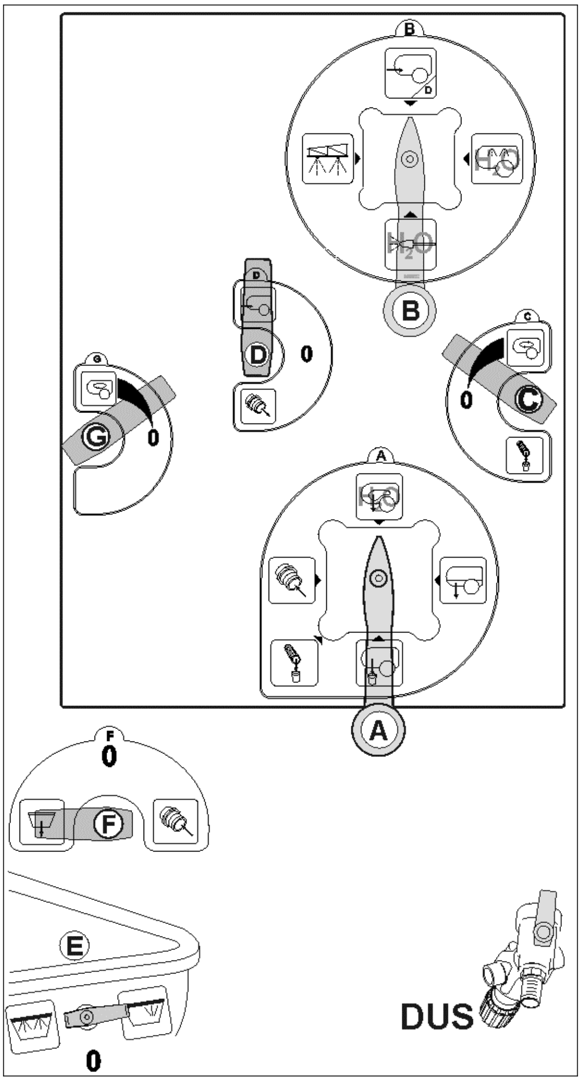


Fig. 126

10.5.5 Ecofill

Fig. 127/…

1. Fill the spray liquid tank halfway with water.
2. Move switch tap **F** to position **0**.
3. Move switch tap **D** (optional) to the position.
4. Move switch tap **B** to the position.
5. Move switch tap **A** to the position.
6. Run the pump at approx. 400 rpm.
7. Open the switch tap on the Ecofill connection.

→ Close the switch tap on the Ecofill connection when the desired quantity has been evacuated from the Ecofill container.

8. Top up with water.

After filling the Ecofill, rinse the counter with flushing water.

1. Move the switch tap **D** to position.
2. Attach the counter to the rinsing stand.
3. Connect the Ecofill connection to the Ecofill coupling.
4. Open the Ecofill switch tap.

→ The counter is rinsed while the pump is on.

5. Reset the Ecofill switch tap and **D** to 0 and disconnect the counter.

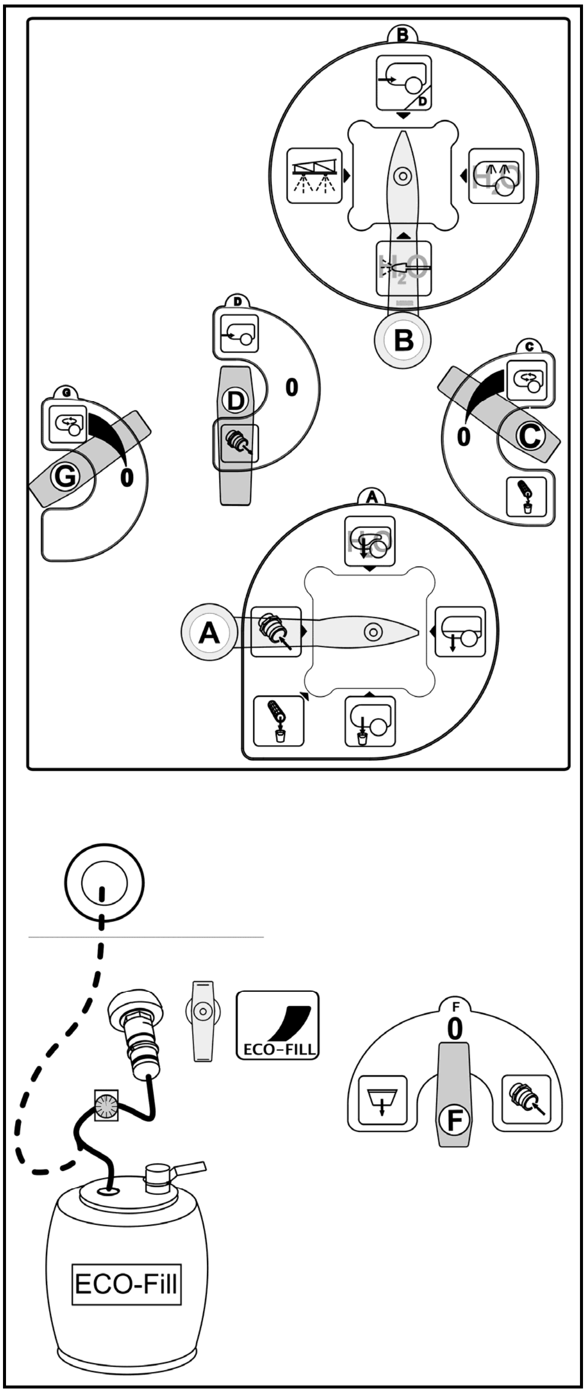


Fig. 127

10.6 Spraying operation

Observe the separate operating manual for the operating terminal.

Special instructions for spraying operation

- Test the field sprayer by carrying out calibration
  - o before the start of the season.
  - o in the case of deviations between the actual indicated spray pressure and the spray pressure prescribed in the spray table.
- Before starting spraying, determine the exact spray rate required, referring to the instructions of the crop protection agent manufacturer.

→ Before starting spraying, enter the required spray rate (target rate) in control terminal/ AMASPRAY$^+$.

- During spraying operation, precisely adhere to the required spray rate [l/ha]
  - o in order to achieve the best possible results from your crop protection measure.
  - o to avoid unnecessary pollution of the environment.
- Select the required nozzle type from the spray table before spraying starts, taking account of
  - o the intended operational speed,
  - o the required spray rate and
  - o the required atomisation characteristic (fine, medium or coarse-dropped) of the crop protection agent used for the crop protection measure.

→ Refer to the section "Spray tables for flat-fan, anti-drift, injector and airmix nozzles", Seite 227.

- Select the required nozzle size from the spray table before spraying starts, taking account of
  - o the intended operational speed,
  - o the required spray rate and
  - o the target spray pressure.

→ Refer to the section "Spray tables for flat-fan, anti-drift, injector and airmix nozzles", Seite 227.

- Select a low operational speed and a low spray pressure to prevent wastage from drifting.

→ Refer to the section "Spray tables for flat-fan, anti-drift, injector and airmix nozzles", Seite 227.

- At wind speeds of 3 m/s, take additional drift reduction measures (refer to the section "Measures for drift reduction", Seite 172.

- Refrain from use if average wind speeds top 5 m/s (leaves and thin twigs move).
- Only switch the sprayer boom on and off during travel to avoid the application of excessive doses.
- Avoid the application of excessive doses through overlapping caused by imprecise bout tracking from one spray path to the next and/or when cornering on the headland with the sprayer boom switched on.
- When increasing operational speed, make sure that the maximum permissible pump drive speed of 550 rpm is not exceeded.
- During spraying operation, constantly check actual spray liquid consumption with reference to the area treated.
- Calibrate the flow meter if there are any differences between the actual and displayed spray rate.
- Calibrate the distance sensor (impulses per 100 m) if there are differences between the actual distance covered, and that displayed. See operating manual for software ISOBUS / AMASPRAY$^+$.
- If spraying operation is interrupted due to bad weather, clean the suction filter, the pump, the valve chest and the spray lines. See page 184.

- Spray pressure and nozzle size influence drop size and the volume of liquid sprayed. The higher the spray pressure, the smaller the droplet diameter of the spray liquid. The smaller droplets are subject to increased, undesirable drifting.
- If the spray pressure is increased, the spray rate also increases.
- If the spray pressure is decreased, the spray rate also decreases.
- If the operational speed is increased while the nozzle size and spray pressure remain constant, the spray rate decreases.
- If the operational speed is decreased while the nozzle size and spray pressure remain constant, the spray rate increases.
- Operational speed and pump drive speed can be selected within broad limits, owing to the automatic, area-based spray rate control via the control terminal / AMASPRAY$^+$.

- The pump delivery capacity is dependent on the pump drive speed. Select the pump speed (between 400 and 550 rpm.) so that there is always an adequate flow rate to the sprayer boom and for the agitator. When making this choice, always take account of the fact that more spray liquid needs to be conveyed at higher operational speeds and higher spray rates.
- The agitator normally remains switched on from filling to the end of spraying operation. On this account, the instructions of the agent manufacturer are decisive.
- If there is a sudden significant drop-off in spray pressure, the spray liquid tank is empty.
- Residues in the spray liquid tank can be applied correctly up to a pressure drop of 25%.
- If the spray pressure drops off while conditions remain otherwise unaltered, the suction or pressure filter is blocked.

10.6.1 Applying the spray liquid

- Properly couple the field sprayer to the tractor.
- Before starting spraying, check the following machine data on the operating terminal
  - the values for the permitted spray pressure range of the spraying nozzles installed in the sprayer boom.
  - the value "Pulses per 100m".
- Take the appropriate action if a fault message appears on the display during spraying.
- Check the indicated spray pressure during spraying operation.

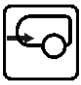
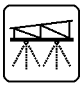
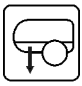
  Ensure that the indicated spray pressure does not deviate under any circumstances by more than ± 25 % from the target spray pressure given in the spray table, e.g. by changing the spray rate using the plus/minus buttons. Larger deviations than this from the target spray pressure make it impossible to achieve the best possible results from your crop protection measure and cause pollution of the environment.

  Decrease or increase the operational speed until you are back within the permissible spray pressure range for the target spray pressure.

Example

Required spray rate:	200 l/ha
Intended operational speed:	8 km/h
Nozzle type:	AI / ID
Nozzle size:	'03'
Permissible pressure range for the spraying nozzle when fitted	min. pressure 3 bar max. pressure 8 bar
Target spray pressure:	3.7 bar
Permissible spray pressure: 3.7 bar ±25 %	min. 2.8 bar and max. 4.6 bar

Fig. 128/...

1. Prepare and stir the spray liquid correctly in accordance with the instructions from the crop protection agent manufacturer. Refer to the section "Preparing the spray liquid", Seite 151.
2. Switch on agitators **C**, **G** (only UG Super). The stirring can be infinitely adjusted:
3. Switch on the control terminal / AMASPRAY$^+$.
4. Fold out the sprayer boom.
5. Depending on the nozzles being used, set the working height of the sprayer boom (gap between the nozzles and the crop) according to the spray table.
6. Switchover tap **F** to position **0**.
7. Switchover tap **E** to position **0**.
8. Switchover tap **D** (optional) to position .
9. Switchover tap **B** to position .
10. Switchover tap **A** to position .
11. Enter the "target rate" value for the required spray rate in the control terminal / AMASPRAY or check the stored value.
12. Run pump at pump operating speed.
13. Select the right tractor gear and move off.
14. Switch on spraying via the control terminal / AMASPRAY.

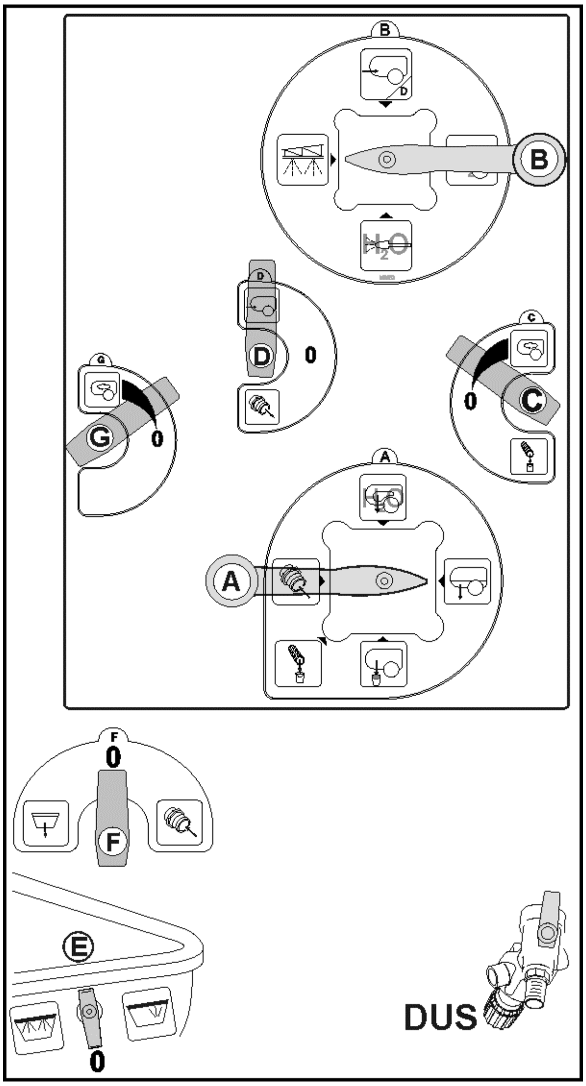


Fig. 128

At low spray rates, the pump speed can be reduced to save energy.

Driving to the field with the agitator switched on

1. Switch off the control terminal / AMASPRAY$^+$.
2. Switch on the universal joint shaft.
3. Set the desired agitating intensity.

If this agitating intensity differs from that required for spraying operation, reset the agitating intensity selected for the journey before commencing spraying operation.

10.6.2 Drift reduction measures

- Reschedule treatment for the early morning or the evening hours (there is generally less wind).
- Choose larger nozzles and a higher water spray rate.
- Reduce spray pressure.
- Precisely maintain the working height of the boom, because the risk of drifting rises very sharply as the distance between the nozzles increases.
- Reduce operational speed (to below 8 km/h).
- Use so-called anti-drift (AD) nozzles or injector (ID) nozzles (nozzles which produce a high proportion of coarse drops).
- Observe the distance requirements of the respective crop protection agent

10.7 Residues

There are three types of residue:

- excessive residue remaining in the spray liquid tank when the spraying operation is finished

→ This excessive residue is discharged diluted or pumped-out and disposed of.

- the technical residue that remains in the spray liquid tank, the suction chest and the spray line when the spray pressure drops off by 25%

  The suction chest is composed of the suction filter, pump and pressure controller sub-assemblies. Observe the values for the technical residues given on page 112.

→ This technical residue is discharged diluted onto the field while cleaning the field sprayer.

- The final residue that remains in the spray liquid tank, the suction chest and the spray line after being cleaned with air discharge from the nozzles.

→ This final diluted residue is drained off after cleaning.

Disposing of residues

- Ensure that the residue in the spray line is still being sprayed at an undiluted concentration. Always spray this residue on an untreated area. The distance needed to use up this undiluted residue can be found in the section "Technical Data - spray lines", page 112. The residue contained in the spray line is dependent on the sprayer boom working width.
- Switch on the agitator for spraying the spray liquid tank empty when the residue in the spray liquid tank is only 5% of the nominal volume. With the agitator switched on, the technical residue increases compared to the specified values.
- Measures intended for the user's protection apply when emptying residues. Observe the instructions from the crop protection agent manufacturer and wear appropriate protective clothing.

10.7.1 Diluting the residue in the spray liquid tank and spraying the diluted residue at the end of spraying operation

For machines with comfort equipment, see operating manual for software ISOBUS.

Fig. 129/...

1. Switch off the sprayer boom.
2. Move switch tap **F** to position **0**.
3. Move switch tap **E** to position **0**.
4. Move switch tap **D** to the position.
5. Move switch tap **B** to the position.
6. Move switch tap **A** to the position.
7. Run the pump at approx. 400 rpm.
8. Dilute the residue in the spray liquid tank with approx. **200** litres from the flushing water tank.
9. Move switch tap **A** to the position.
10. Move switch tap **B** to the position.
11. Move switch tap **D** to the position.
12. Spray the diluted residue onto an **untreated area**.
13. When the residue in the spray liquid tank falls below 50 litres, switch agitator **C** and **G** (UG Super) to **0**.
14. Flush the bypass line and pressure relief by switching spraying on and off five times.

- Keep spraying switched off for at least 10 seconds each time.
- The spray pressure should be at least 5 bar.

15. Repeat steps 3 to 14.

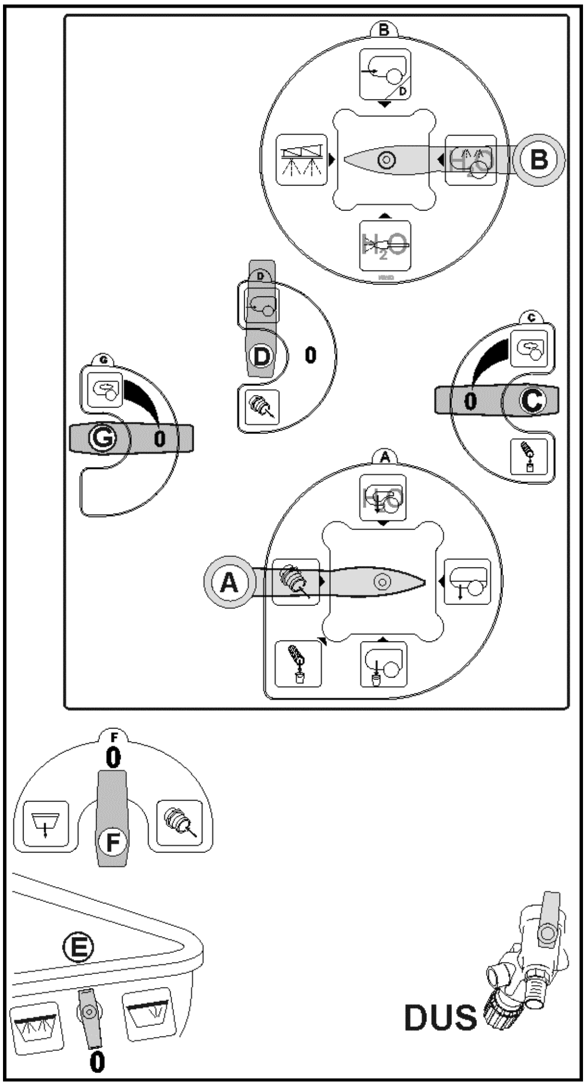


Fig. 129

10.7.2 Draining the spray liquid tank using the pump

Fig. 130/...

1. Connect the drainage hose to the drainage connection on the machine side using a two-inch camlock coupling.
2. Push the guard plate to the side and move switch tap **D** to the position.
3. Move switch tap **B** to the position.
4. Move switch tap **A** to the position.
5. Run the pump at pump operating speed (540 rpm).

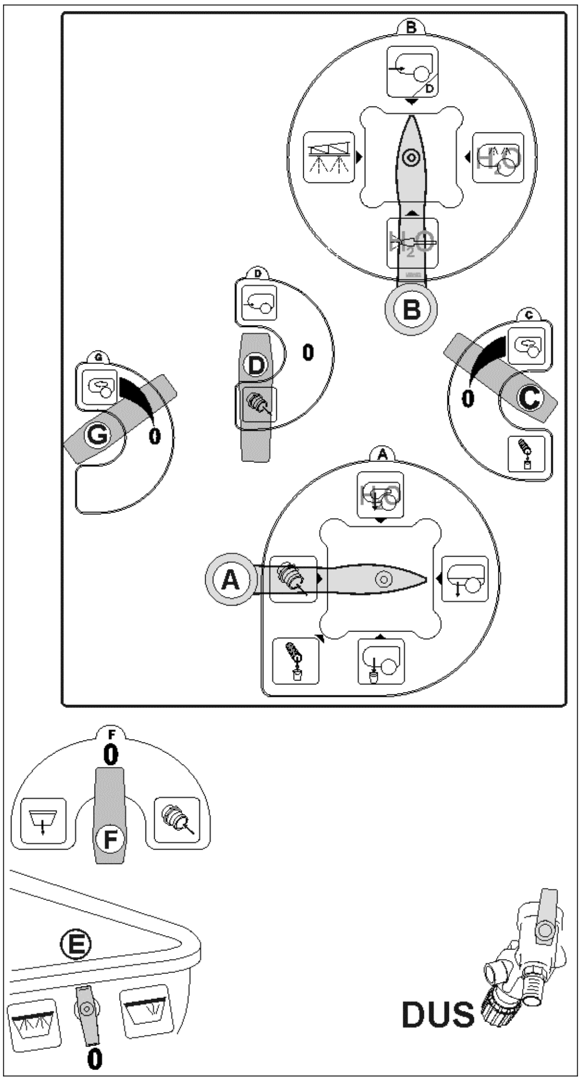


Fig. 130

10.8 Cleaning the field sprayer

- Keep the exposure time as short as possible, for example by daily cleaning after the spraying operation is complete. Do not leave the spray liquid in the spray liquid tank for an excessively long period, i.e. overnight.

  The service life and reliability of the field sprayer mainly depend on the exposure time of the crop protection agent on the materials of the field sprayer.
- Clean the field sprayer thoroughly before applying a different crop protection agent.
- Carry out the cleaning process on the field where you last carried out the treatment.
- Carry out the cleaning process using water from the flushing water tank.
- You can carry out the cleaning process in the courtyard if you have a collecting facility installed (e.g. a Biobed).

  Observe all national regulations involved.
- When spreading residues on areas already treated, observe the maximum permissible spray rate of the agents.

For machines with comfort equipment, see operating manual for software ISOBUS.

10.8.1 Cleaning the sprayer with the tank empty

- Clean the spray liquid tank on a daily basis!
- The flushing water tank must be filled completely.
- The cleaning process should be carried out in a threefold reduction procedure.

Fig. 131/...

1. Set the pump drive pumping speed to 450 rpm.
2. Switch tap **A** in position .
3. Switch tap **B** in position .
4. Agitator **C**,open **G** completely to remove deposits in the in the hose.

→ Flush the agitators with 10 % of the flushing water supply.

5. Switch off the agitator(s).

DUS: Spray lines are automatically rinsed. To do so, use 10 % of the flushing water supply.

6. Switch tap **B** in position .

→ Perform internal cleaning with 10 % of the flushing water supply.

7. Switch tap **B** in position .
8. Switch tap **A** in position .
9. Spreads residues already diluted on the treated area when driving.
10. Using the on-board computer, switch sprayer on and off several times for several seconds.

The valves and return lines are flushed by switching on and off.

→ Keep flushing the diluted residues until air escapes from the nozzles.

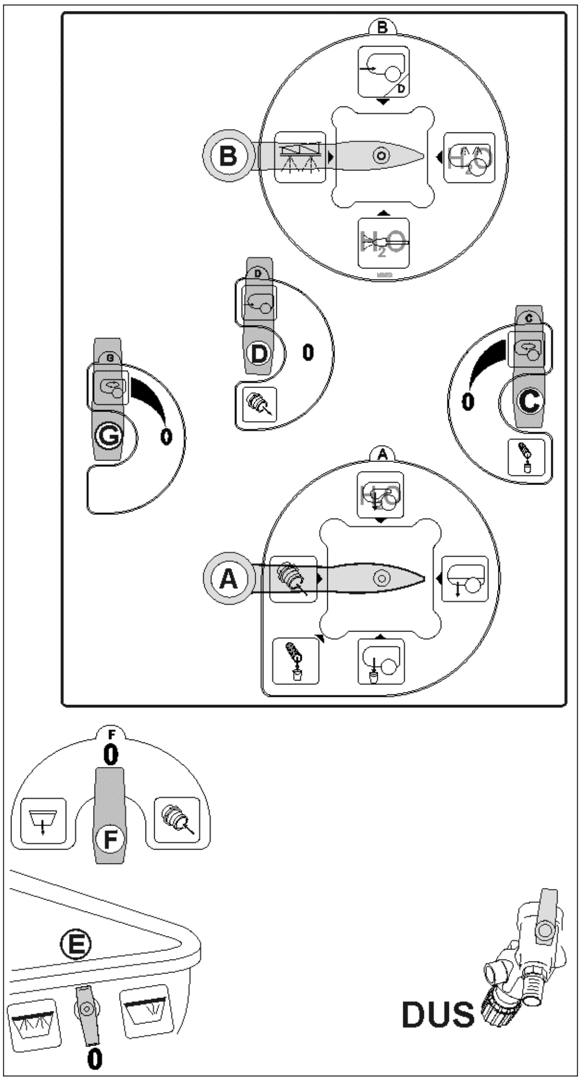


Fig. 131

Repeat this procedure three times.

Third pass:

- rinsing of the DUS and agitators is not necessary during the third pass.
- use the rest of the flushing water supply for the internal cleaning.

11. Drain the final residue, see page **179**.
12. Cleaning the suction filter and pressure filter, see page **180**, **181**.

10.8.2 Draining the final residues

- On the field: Spread the final residues over the field.
- In the courtyard:
  - Place a suitable collecting container under the drain opening of the suction chest and the drain hose for the pressure filter and collect the final residues.
  - Dispose of the collected spray liquid residue in accordance with the corresponding legal guidelines.
  - Collect the spray liquid residues in suitable containers.

1. Place a suitable collection vessel under the outlet opening of the VARIO switch tap on the suction side.
2. Move switch tap **A** to the position and dump the final residue from the spray liquid tank into a suitable collection vessel.
3. Move switch tap **A** to the position and dump the final residue from the suction chest into a suitable collection vessel.
4. Place a suitable collection vessel under the outlet opening of the pressure filter.
5. Press guard plate back; set setting tap **C** to position and drain the final residue from the pressure filter.

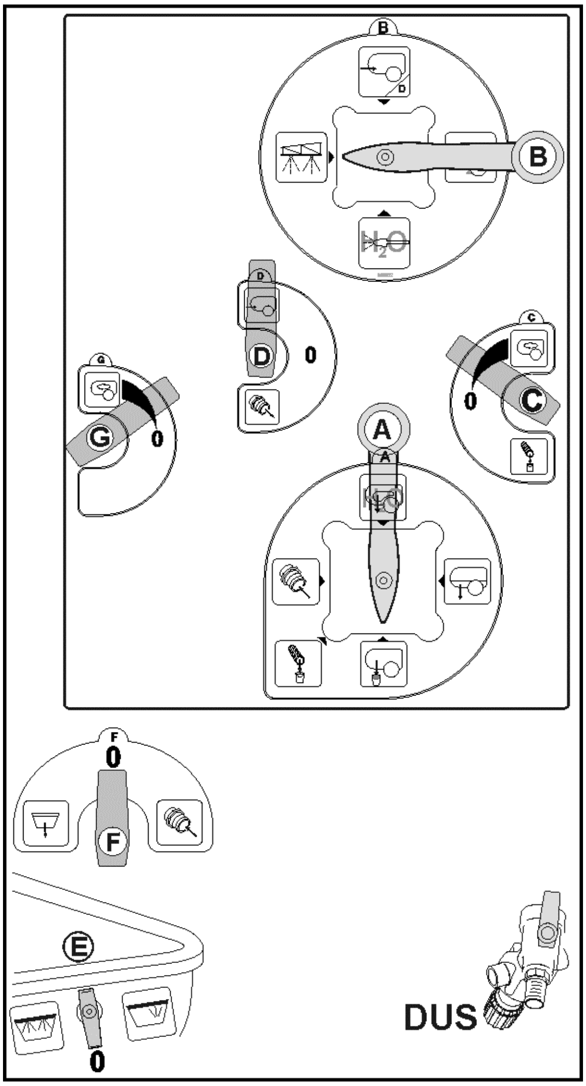


Fig. 132

10.8.3 Cleaning the suction filter when tank is empty

Clean the suction filter (Fig. 133) on a daily basis after cleaning the field sprayer.

1. Unscrew the cover of the suction filter (Fig. 133/2).
2. Remove the cover with suction filter (Fig. 133/3) and clean with water.
3. Reassemble the suction filter in the reverse sequence.
4. Check the filter housing for leaks.

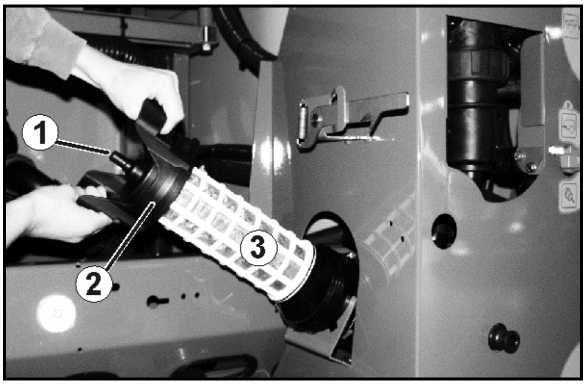


Fig. 133

10.8.4 Cleaning the suction filter when tank is full

1. Run the pump, adjust pump speed to 300 rpm.
2. Move switch tap **D** to the position.
3. Move switch tap **B** to the position.
4. Switch off agitator(s) **C, G** (UG Super).
5. Move switch tap **A** to the position.
6. Loosen cover plate on the suction filter (Fig. 133/1).
7. Activate relief valve on the suction filter (Fig. 133/2).
8. Remove cover plate and suction filter (Fig. 133/3) and clean with water.
9. Reassemble the suction filter in the reverse sequence.
10. Move switch tap **A** to the position.
11. Check the suction filter for leak tightness.

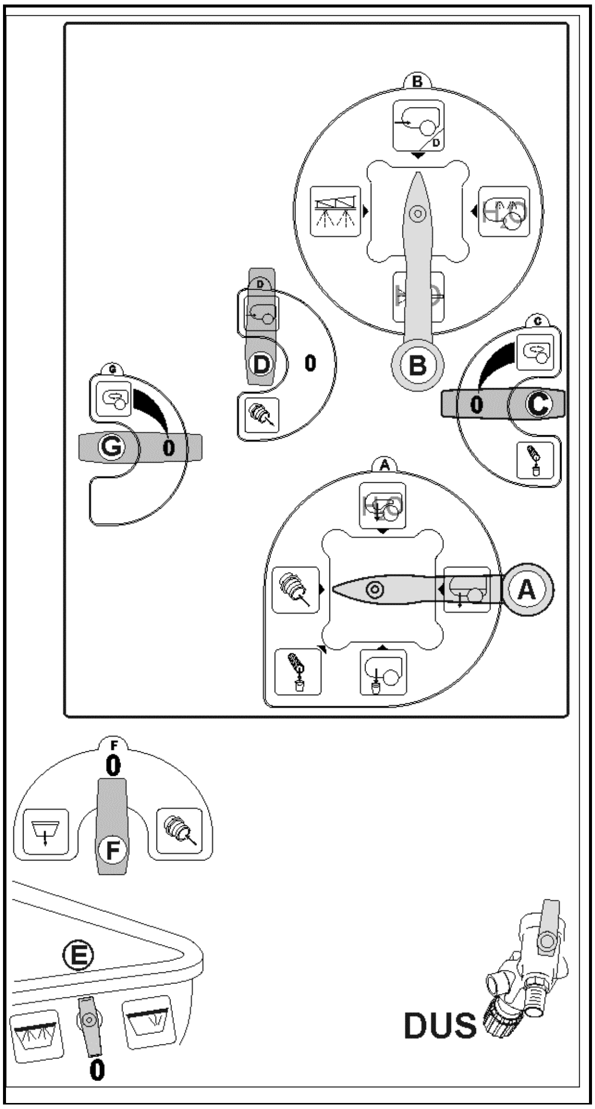


Fig. 134

10.8.5 Cleaning the pressure filter when the tank is empty

1. Undo the sleeve nuts.
2. Remove the pressure filter (Fig. 135/1) and clean with water.
3. Refill the pressure filter.
4. Check the screw connection for leaks.

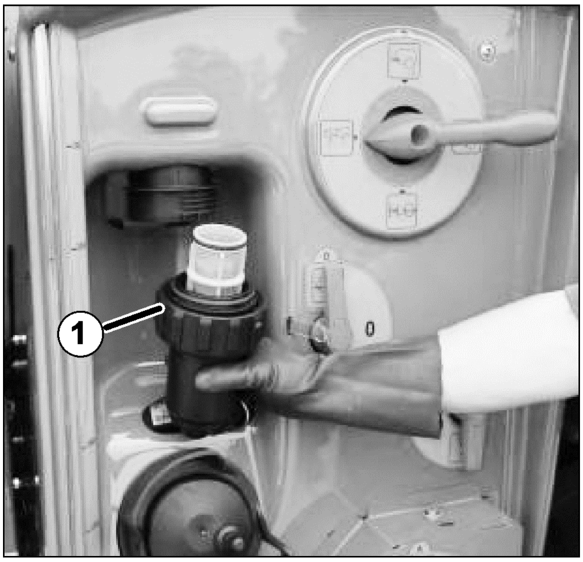
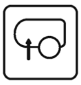
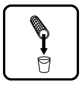


Fig. 135

10.8.6 Cleaning the pressure filter when the tank is full

1. Manually move suction chest **A** to position .
2. Move switch tap **C** to position .

→ Drain the residue into the pressure filter.

1. Undo the sleeve nuts.
2. Remove the pressure filter (Fig. 135/1) and clean with water.
3. Refill the pressure filter.
4. Check the screw connection for leaks.
5. Move switch tap **C** to position **0**.

10.8.7 External cleaning

Fig. 136/…

1. Move switch tap **F** to position **0**.
2. Move switch tap **E** to position **0**.
3. Move switch tap **D** (optional) to the H_2O.
4. Move switch tap **B** to the H_2O position.
5. Move switch tap **A** to the H_2O position.
6. Run the pump at pump operating speed (at least 400 rpm).
7. Clean the field sprayer and the sprayer boom with the spray gun.

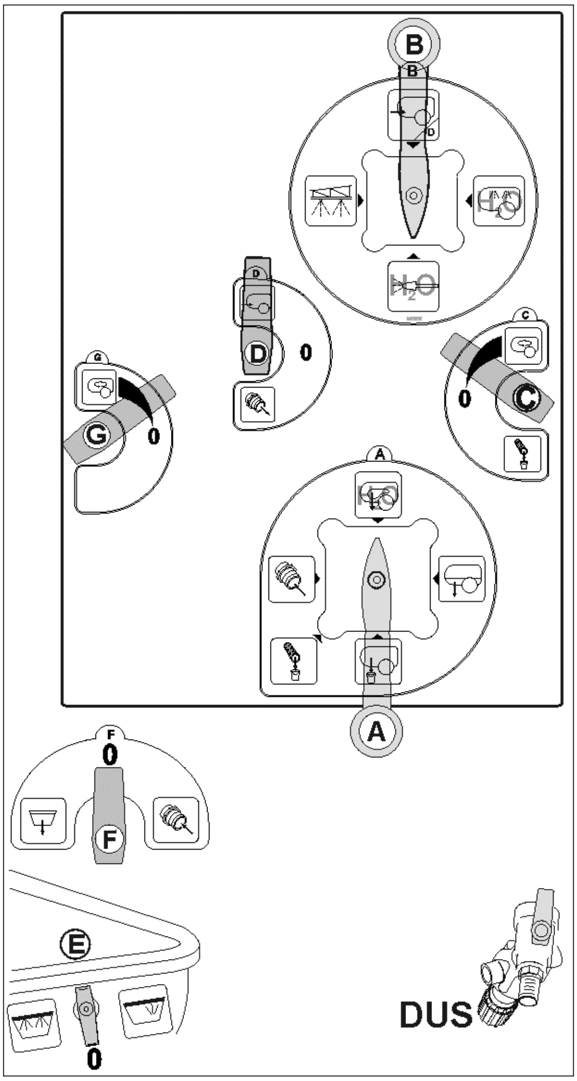


Fig. 136

10.8.8 Cleaning the sprayer during a critical agent change

1. Clean the sprayer in three runs as always, see page 177
2. Fill up the flushing water tank.
3. Clean the sprayer, two runs, see page 177.
4. If the sprayer has been previously filled via the pressure connector:

   Clean the induction bowl using the spray pistol and extract the content of the induction bowl.
5. Drain the final residue, see page 179.
6. By all means, clean the suction filter and pressure filter, see page 180.
7. Clean the sprayer, one run, see page 177.
8. Drain the final residue, see page 179

10.8.9 Cleaning the sprayer with a full tank (work interruption)

If spraying is interrupted due to bad weather, clean the suction chest (suction filter, pumps, pressure controller) and spray line.

Fig. 137/...

1. Switch off spraying at operator control terminal.
2. Switch off agitator **C**.
3. Move switch tap **B** to the position.
4. Move switch tap **A** to the H_2O position.
5. Run the pump at pump operating speed (at least 400 rpm).
6. Approx. 20 seconds after switching on the pump, close the DUS tap (DUS option) to avoid separation of the spray liquid.
7. Then spray the undiluted residue out of the sprayer boom onto an **untreated** area.
8. Then spray the residue - which has been diluted with water from the flushing water tank - out of the suction filter, pump, valve chest and spray line on to an **untreated** area.
9. Dump the technical residue from the valve chest into a suitable collection vessel; see Seite 179.
10. Clean the suction filter; see Seite 180.
11. Switch off pump drive.
12. Reopen the DUS tap.

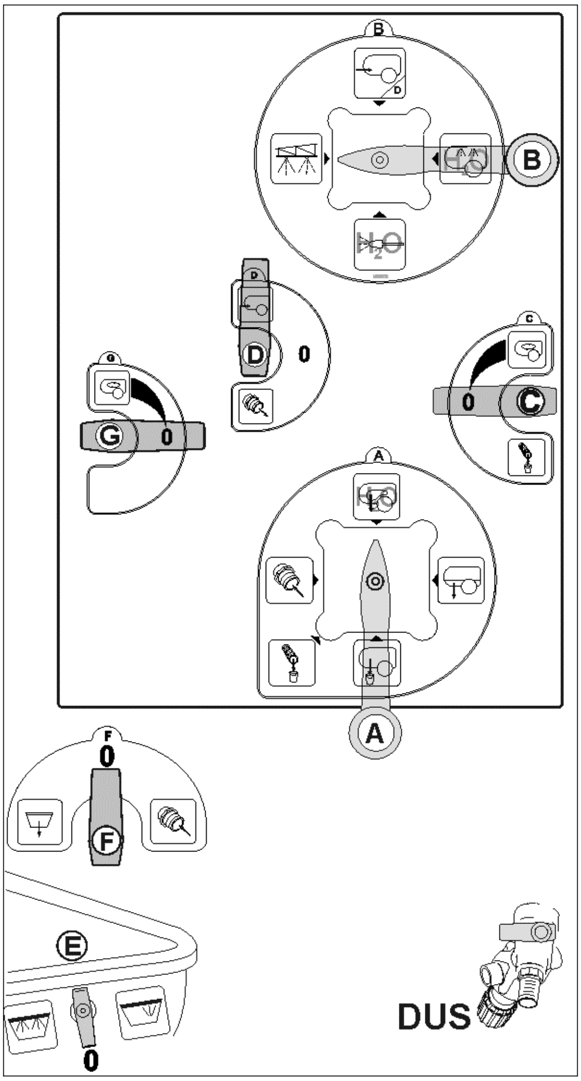


Fig. 137

Continuing the spraying operation

Before continuing with the spraying operation, activate the pump for five minutes at 540 min^{-1} and switch on the agitators completely.

11 Faults

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through

- **unintentional falling of the machine raised using the tractor's three-point linkage.**
- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**

Secure the tractor and the machine against unintentional start-up and rolling before eliminating faults on the machine. See page 135.

Wait for the machine to stop before entering the machine danger area.

Fault	Cause	Remedy
There is no suction from the pump	Blockage on the suction side (suction filter, filter insert, suction hose).	Remove the blockage.
	Pump is sucking in air.	Check the hose connection of the suction hose (optional) on the suction port for leak tightness.
The pump does not have any power	Suction filter and filter insert dirty.	Clean suction filter and filter insert.
	The valves are jammed or damaged.	Change the valves.
	Pump is sucking in air, recognisable from the air bubbles in the spray liquid tank.	Check the hose connections on the suction hose for leak tightness.
The spray cone vibrates	Irregular delivery flow from the pump.	Check, and if necessary replace, the suction and pressure-side valves (see Seite 216).
Oil/spray liquid mixture in the oil filler neck or clearly visible consumption of the oil	Pump diaphragm defective.	Change all six piston diaphragms (see 218).
The required spray rate entered is not achieved	High operational speed; low pump drive speed;	Reduce travel speed and increase the pump drive speed until the fault message goes off.
There has been a deviation from the permissible spray pressure range for the nozzle fitted to the sprayer boom	Deviation from the prescribed operational speed, which has an effect on the spray pressure	Alter your operational speed to return to the prescribed operational speed range set for spraying operation

12 Cleaning, maintenance and repair

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through

- **unintentional falling of the machine raised using the tractor's three-point linkage.**
- **unintentional falling of raised, unsecured machine parts.**
- **unintentional start-up and rolling of the tractor-machine combination.**

Secure the tractor and machine against unintentional start-up and rolling, before carrying out cleaning, maintenance or repair work on the machine; see page 135.

WARNING

Risk of crushing, shearing, cutting, being caught and/or drawn in, or impact through unprotected danger points.

- Mount protective equipment removed when cleaning, maintaining and repairing the machine.
- Replace defective protective equipment with new equipment.

DANGER

- **When carrying out maintenance and repair, observe the safety instructions, particularly "Field sprayer operation" section, Seite 35.**
- **You may only carry out maintenance or repair work under moving machine parts that are in a raised position if such parts are secured with suitable, positive-fit locking devices against accidental lowering.**

Before each start-up

1. Check hoses/tubes and connection pieces for any visually obvious defects/leaking connections.
2. Repair any areas of chafing on hoses and pipes.
3. Immediately replace worn or damaged hoses and pipes.
4. Immediately repair leaking connections.

- Regular and proper maintenance will keep your trailed sprayer in good condition for a long time, and will prevent early signs of wear. Regular and proper maintenance is a requirement of our warranty conditions.
- Use only genuine AMAZONE spare parts (see "Spare and wear parts and aids" section, page 17).
- Use only genuine AMAZONE replacement hoses, and hose clamps made of V2A for assembly.
- Specialist knowledge is the requirement for carrying out testing and maintenance operations. This specialist knowledge is not given here in this operating manual.
- Observe environmental protection measures when carrying out cleaning and maintenance work.
- Observe legal requirements when disposing of lubricants, e.g. oils and grease. Also affected by these legal requirements are parts that come into contact with these lubricants.
- Do not exceed a greasing pressure of 400 bar when greasing with high pressure grease guns.
- The following are prohibited:
  - drilling the running gear.
  - drilling through pre-existing holes on the transport frame.
  - welding load-bearing components.
- Protective measures are necessary, such as covering lines or extending lines in particularly critical locations
  - during welding, drilling and grinding work.
  - when working with cut-off wheels near plastic lines and electric wires.
- Clean the field sprayer thoroughly with water before carrying out repair work.
- Carry out repair work on the field sprayer with the pump switched off.
- Thorough cleaning must be carried out before repair work can be carried out inside the spray liquid tank. Keep out of the spray liquid tank.
- Disconnect the machine cable and power supply from the on-board computer when carrying out any cleaning or maintenance work. This applies especially to welding on the machine.

12.1 Cleaning

- Pay particular attention to the brake, air and hydraulic hose lines.
- Never treat brake, air or hydraulic hose lines with benzin, benzene, petroleum or mineral oils.
- After cleaning, grease the machine, in particular after cleaning with a pressure washer / steam jet or liposoluble agents.
- Observe the statutory requirements for the handling and removal of cleaning agents.

Cleaning with a pressure washer / steam jet

- Always observe the following points when using a pressure washer / steam jet for cleaning:
    - Do not clean any electrical components.
    - Do not clean any chromed components.
    - Never aim the cleaning jet of the cleaning nozzle of the high pressure cleaner/steam jet directly at lubrication points, bearings, rating plates, warning signs, and stickers.
    - Always maintain a minimum jet distance of 300 mm between the pressure washer or steam jet cleaning nozzle and the machine.
    - The set pressure of the high-pressure cleaner / steam jet must not exceed 120 bar.
    - Comply with safety regulations when working with pressure washers.

12.2 Winter storage and long periods out of operation

1. Clean the field sprayer thoroughly before placing it in winter storage; see Seite 188.
2. Remove and clean the suction filter (Fig. 138/1); see Seite 180.
3. Run the pump at a universal joint shaft speed of 300 rpm and let it "pump dry" when flushing is complete and liquid is no longer coming out of the spraying nozzles.
4. Switch off the universal joint shaft.
5. Agitator:
   - 5.1 Drain the pressure filter (Fig. 138/2) via tap **C**.

     Setting tap **C** to position .
   - 5.2 Unscrew the agitator hose (Fig. 139/4) (which comes out of tap **C**) from the spray liquid tank.
6. Unscrew the supply hose (Fig. 139/1) from the control valve. The supply hose connects the VARIO switch tap on the pressure side (Fig. 138/**B**) with the suction chest.
7. Unscrew the return hose (Fig. 139/2) for the part width section valve from the VARIO switch tap on the suction side (Fig. 138/**A**).
8. Detach the hose (Fig. 140/1) from the switch tap **F**.

   Swivel the switch tap **F** (Fig. 140/2) to position .
9. Remove the internal cleaning hose (Fig. 139/3) for the VARIO switch tap on the pressure side (Fig. 138/**B**).
10. Remove the pressure hose (Fig. 141/1) for the pump so that any remaining water can flow out of the pressure hose and VARIO switch tap on pressure side **B**.
11. Also remove the external cleaning hose even if there is no external cleaning (Fig. 139/5).

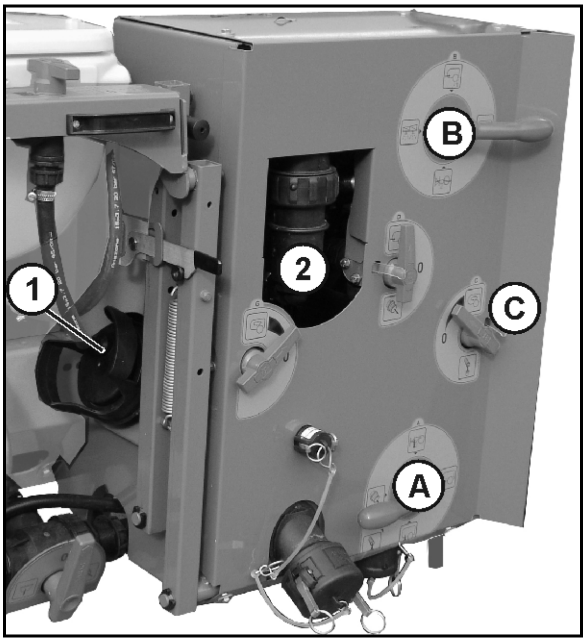


Fig. 138

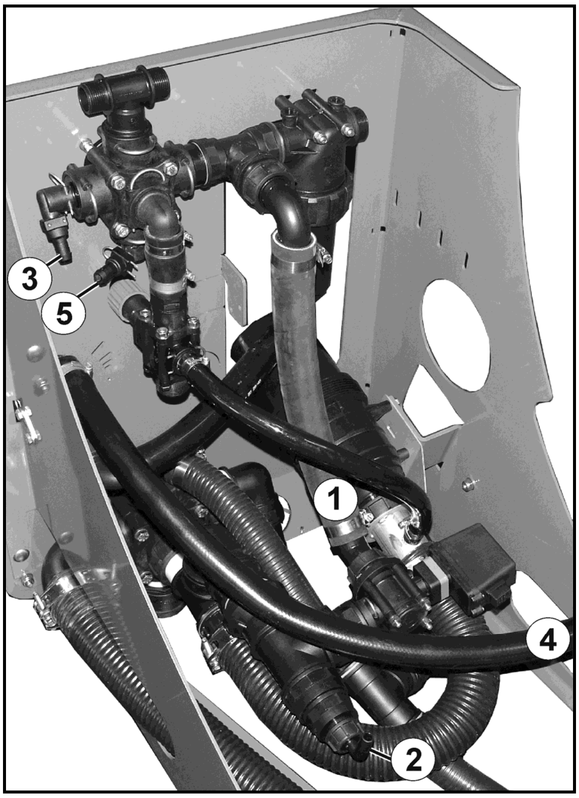


Fig. 139

12. Switch the universal joint shaft back on and run the pump for approx. ½ a minute until liquid is no longer coming out of the pressure-side connection.

Do not refit the pressure hose until it is needed again.

13. Remove all the spray lines from the part width section valves (Fig. 142/1) and blow out with compressed air.
14. Remove all the nozzles.
15. Move the VARIO switch tap on the suction side (Fig. 138/**A**) and the VARIO switch tap on the pressure side (Fig. 138/**B**) several times between all their switch positions.
16. Move all remaining switch levers several times between all their switch positions.

Store the removed suction filter until it is needed again in the field sprayer filling sieve.

17. Cover the pump pressure connection to protect it from dirt.
18. If the sprayer is also equipped with a pressure circulating system
    - Remove the drain plug (Fig. 143/1) from the pressure relief valve.
    - Open the DUS switchover tap (Fig. 143/2).
19. Lubricate the universal joints on the PTO shaft and, for longer periods out of operation, grease the section tube.
20. Before winter storage, change the oil in the pump.

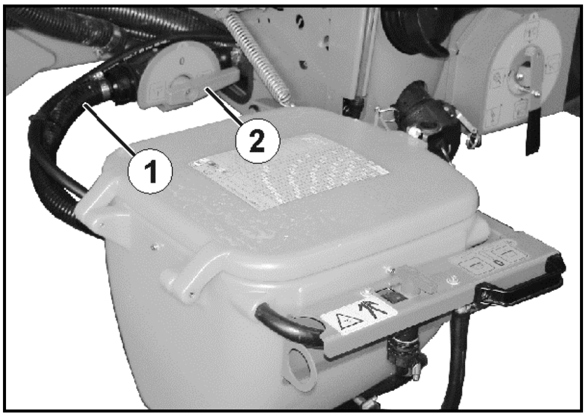


Fig. 140

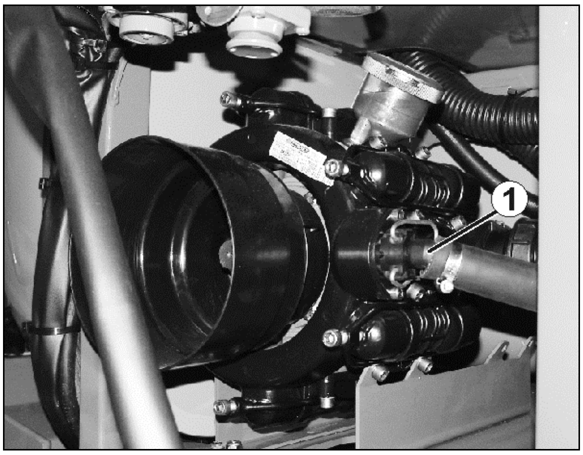


Fig. 141

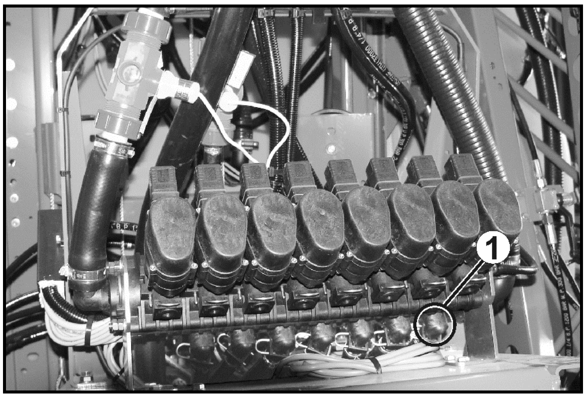


Fig. 142

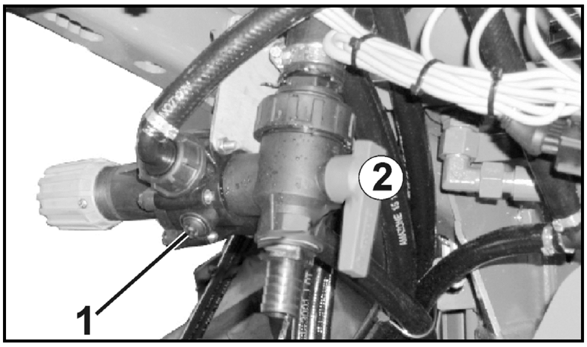


Fig. 143

21. **Super-S boom:** drain the pressure sensor (Fig. 144/1) of the boom fitting with the boom lowered by removing the hose from the pressure sensor..

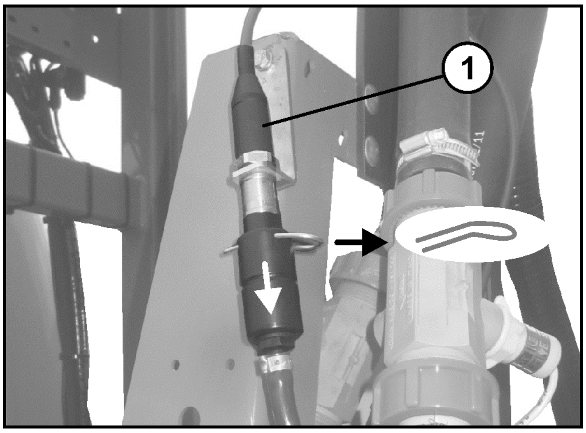


Fig. 144

22. **Super-L1 boom:** drain the pressure sensor of the boom fitting with the boom lowered by removing the hose from the pressure sensor.

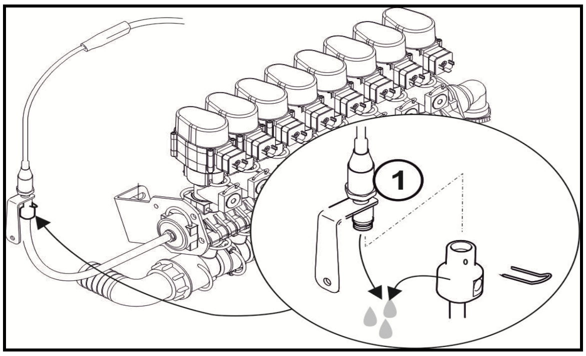


Fig. 145

23. Drain the flushing water tank, by removing the hose from the des flushing water tank.

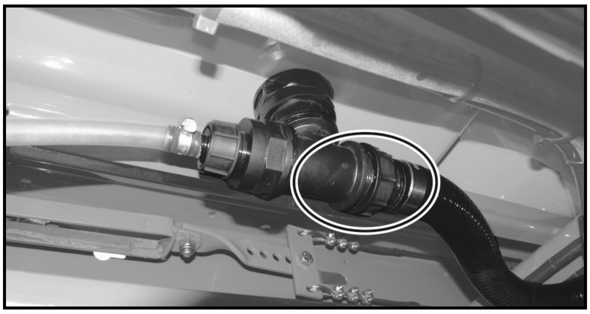


Fig. 146

Before starting up again:

- Install all of the dismantled parts.
- Close the suction port drainage tap.
- At temperatures below freezing, hand crank the piston diaphragm pumps before starting to prevent residual ice from damaging the piston and piston diaphragm.
- Store the pressure gauge and any other electronic accessories in a place where they are safe from frost!

12.3 Lubrication instructions

Lubricate all grease nipples (keep gaskets clean).

Lubricate / grease the machine at the specified intervals.

Lubrication points on the machine are indicated with the foil (Fig. 147).

Carefully clean the lubrication points and grease gun before lubrication so that no dirt is pressed into the bearings. Press the dirty grease out of the bearings completely and replace it with new grease.

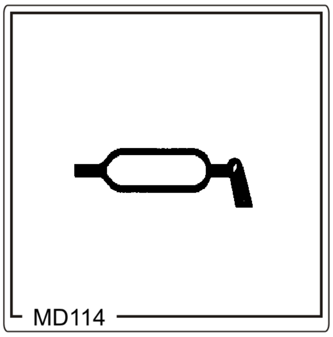


Fig. 147

12.3.1 Lubricants

For lubrication, use a lithium saponified, multipurpose grease with EP additives:

Company	Lubricant designation	
	Normal use conditions	Extreme use conditions
ARAL	Aralub HL 2	Aralub HLP 2
FINA	Marson L2	Marson EPL-2
ESSO	Beacon 2	Beacon EP 2
SHELL	Retinax A	Tetinax AM

12.3.2 Lubrication point overview

Fig. 148	Lubrication point	Interval [h]	Number of lubrication points	Type of lubrication
1	Towing eye	50	1	Grease
2	Drawbar bearing	50	2	Grease
3	Parking brake	100	1	Grease the cables and guide rollers. Grease the spindle using the grease nipple.
Fig. 149	PTO shaft	see unterhalb	5	
Fig. 150	Axle			
1	Brake shaft bearing, outer and inner	200		
2	Linkage adjuster	1000		
3	Renew wheel hub bearing grease, check taper roller bearings for wear	1000		

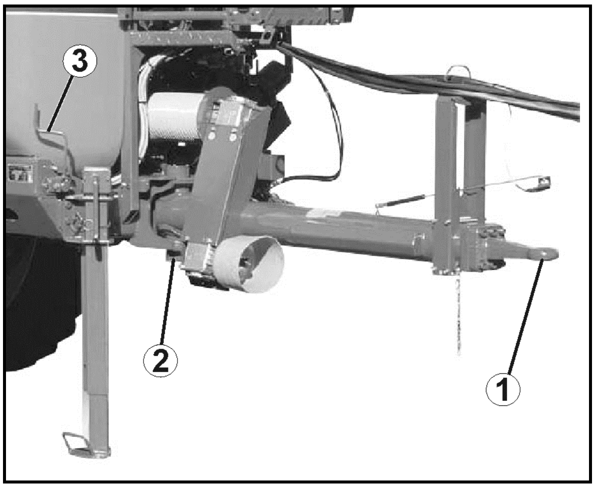


Fig. 148

PTO shaft

For winter operation, grease the protective tubes to prevent them from freezing.

Also observe the installation and service instructions from the PTO shaft manufacturer, which are fastened to the PTO shaft.

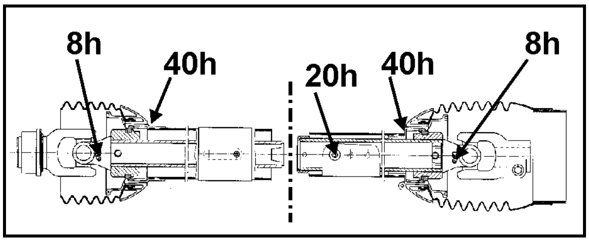


Fig. 149

Axle

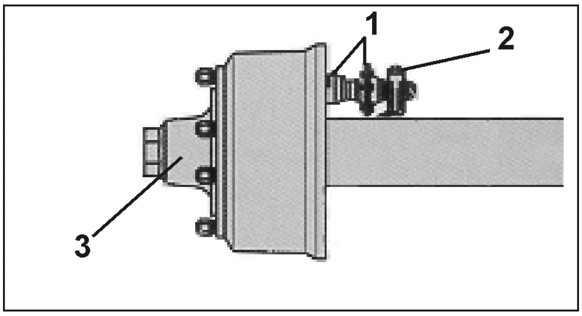


Fig. 150

Brake shaft bearing, outer and inner

Caution: no grease or oil should be allowed to get into the brakes. Depending on the model series, the cam bearing for the brakes may not be sealed.

Only use lithium saponified grease with a dropping point greater than 190 °C.

Renewing the wheel hub bearing grease

1. Jack up the vehicle securely and release the brakes.
2. Remove the wheels and dust caps.
3. Remove the lynch pin and unscrew the axle nut.
4. Use a suitable extraction device to remove the wheel hub and brake drum, taper roller bearing and sealing elements from the axle stub.
5. Label the removed wheel hubs and bearing cages so that you do not confuse them when refitting.
6. Clean the brakes, check for wear, sound condition and function and replace worn parts.

   The interior of the brake must be kept free from lubricants and dirt.
7. Thoroughly clean the interior and exterior of the wheel hubs. Remove all traces of old grease. Thoroughly clean the bearings and seals (diesel oil) and check for reusability.

   Before refitting the bearings, lightly grease the bearing carrier and then refit all parts in the reverse order. Carefully fit parts with press fits and pipe bushings so that they are not twisted or damaged.

   The bearings, the wheel hub cavity between the bearings and the dust cap must be smeared with grease before fitting. The grease should fill approximately a quarter to a third of the space in the fitted hub.
8. Fit the axle nut and adjust the bearing and brake. Finally, carry out a function check and an appropriate test run and rectify any detected faults.

12.4 Service plan – overview

- Carry out maintenance work when the first interval is reached.
- The times, continuous services or maintenance intervals of any third party documentation shall have priority.

After the first working run

Component	Maintenance work	see page	Workshop work
Wheels	• Wheel nut check	205	
Hydraulic system	• Check for leak tightness	207	
Spraying pump	• Check the oil level	215	

On a daily basis

Component	Maintenance work	see page	Workshop work
Whole machine	• Visual check for faults		
Fluid filter (Profi-folding)	• Check the clogging indicator	210	
	If necessary, replace		X
Spraying pump	• Cleaning, flushing	215	
Spray liquid tank		176	
Line filter in the nozzle lines (if present)		222	
Spraying nozzle		221	
Brake	• Drain air reservoir	201	

Weekly / every 50 working hours

Component	Maintenance work	see page	Workshop work
Hydraulic system	• Check for leak tightness	207	X
Wheels	• Check the air pressure.	205	

Every three months / 200 operating hours

Component	**Maintenance work**	**see page**	**Workshop work**
Brake	• Check for leak tightness • Check pressure in the air reservoir • Check brake cylinder pressure • Visual inspection of brake cylinder • Joints on brake valves, brake cylinders and brake linkages	203	**X**
	• Linkage adjuster brake settings	200	**X**
	• Brake pad check		
Wheels	• Check play on wheel hub bearings	199	**X**
Line filter	• Clean • Replace damaged filter inserts	222	
Parking brake	• Check the braking effect with the brake on	204	

Annually / 1000 operating hours

Component	**Maintenance work**	see page	**Workshop work**
Spraying pump	• Changing the oil	215	**X**
	• Check valves, replace as necessary	216	**X**
	• Check the piston diaphragm and, if necessary replace	217	**X**
Flow meter and return flow meter	• Calibrate the flow meter • Align the return flow meter	218	
Nozzles	• Calibrate the field sprayer and check the lateral distribution; if necessary, replace worn nozzles	221	
Brake drum	• Check for dirt	199	**X**
Wheels	• Wheel nut check	205	
Brake	Automatic linkage adjuster • Check function • Brake settings	200	**X**

As necessary

Component	**Maintenance work**	see page	**Workshop work**
Super-S boom	• Correct the settings	212	
Electric lighting	• Replace defective bulbs	224	
Solenoid valves	• Clean	210	**X**
Hydraulic throttle valve	• Adjusting the operating speed	212	
Drawbar	• Replace worn parts	197	
Hydraulic plug	• Rinse / exchange the filter in the hydraulic plug	211	

12.5 Drawbars

DANGER!

- **Replace damaged drawbars immediately on road safety grounds.**
- **Repairs may only be carried out by the manufacturing factory.**
- **For reasons of safety, performing welding and drilling work on the drawbar is prohibited**

Regularly lubricate the drawbar.

Yoke bar

The pulling eye diameter of the yoke bar, when new, is 40 or 50 mm.

Wear to the pulling eye is permissible; this will increase the pulling eye diameter by up to 1.5 mm.

If wear is greater than this, the wearing bushing on the pulling eye must be promptly replaced.

Hitch drawbar

Wear to the pulling eye is permissible; this will increase the pulling eye diameter by up to 1.5 mm.

If wear is greater than this, the ball point coupling on the eye must be promptly replaced.

12.6 Axle and brake

For optimum brake performance with a minimum of wear, we recommend that the brakes on the tractor are balanced with those on the trailed sprayer. After the service braking system has been run in for a suitable period, arrange for the brakes to be balanced by a specialist workshop.

Have the balancing process carried out before these empirical values are reached if you discover excessive wear on the brake pads.

To avoid problems with the brakes, adjust all vehicles in accordance with EC Directive 71/320 EEC.

WARNING

- **Repair and adjustment work on the service braking system should only be carried out by trained specialist personnel.**
- **Special care is required for welding, torch cutting and drilling work in the vicinity of brake lines.**
- **Always perform a braking test after any adjusting or repair work on the braking system.**

General visual inspection

WARNING

Carry out a general visual inspection of the brake system. Observe and check the following criteria:

- **Pipe lines, hose lines and coupler heads must not be externally damaged or corroded.**
- **Hinges, e.g. on fork heads, must be properly secured, easy to move, and not worn out.**
- **Ropes and cables**
  - **must be properly run.**
  - **may not have any visible cracks.**
  - **may not be knotted.**
- **Check the piston stroke on the brake cylinders, and adjust as necessary.**
- **The air reservoir must not**
  - **move around in the tensioning belts.**
  - **be damaged.**
  - **show any outward signs of corrosion damage.**

Checking the brake drum for dirt (workshop work)

1. Unscrew the two cover plates (Fig. 151/1) on the inside of the brake drum.
2. Remove any dirt and plant debris which may have entered the drum.
3. Refit the cover plates.

CAUTION

Dirt entering the drums may be deposited on the brake pads (Fig. 151/2) and thus die appreciably reduce brake performance.

Risk of accident.

If dirt is discovered in the brake drum, the brake pads must be inspected by a specialist workshop.

For this to happen, the wheel and brake drum must be removed.

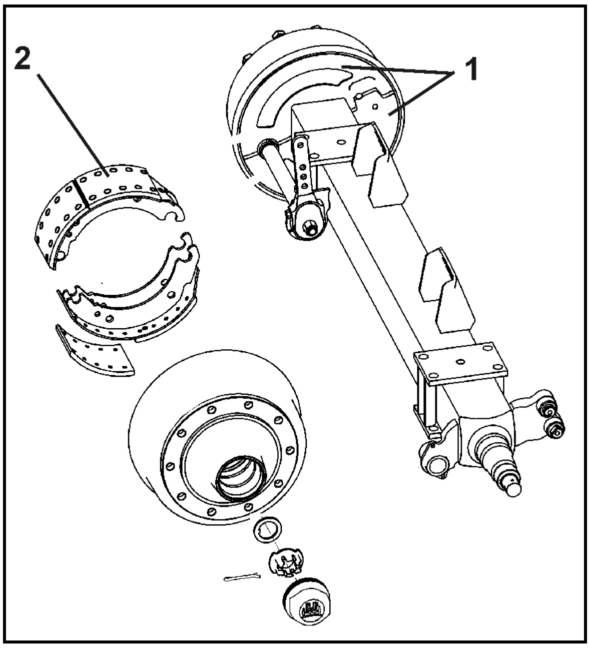


Fig. 151

Checking wheel hub bearing clearance (workshop work)

To check the play on wheel hub bearings, raise the axle until the wheels turn freely. Release the brake. Place a lever between the tyre and the ground and check the play.

If bearing play can be detected:

Adjust the bearing play

- Remove the dust cup or hub cap.
- Remove the split pin from the axle nut.
- Tighten the wheel nut while turning the wheel at the same time until the wheel hub is lightly braked as it turns.
- Turn axle nut back to the next available split pin hole. To the next matching hole (max. 30°).
- Fit split pin and bend slightly open.
- Top up the dust cap with high melting point grease and drive it into, or screw it onto the wheel hub.

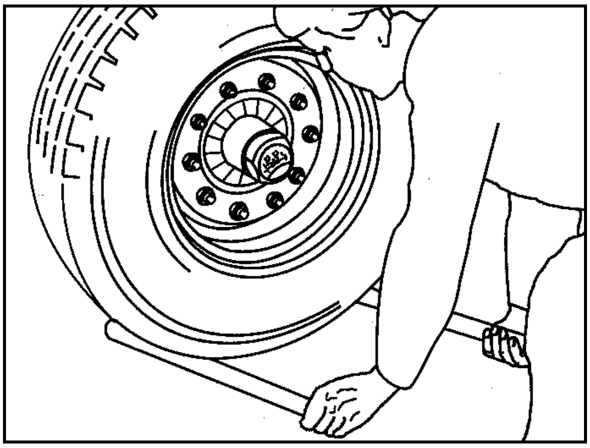


Fig. 152

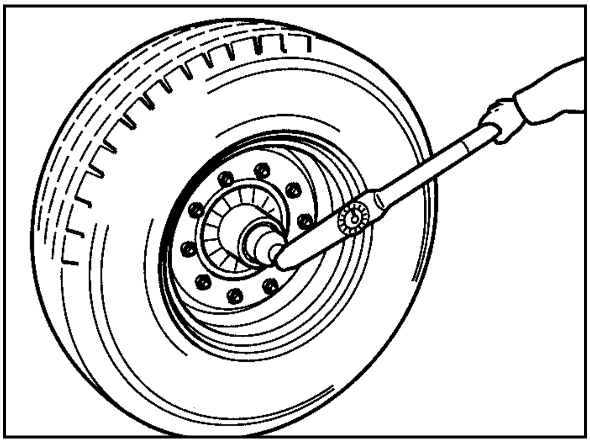


Fig. 153

Brake pad check

Open the inspection hole (Fig. 154/1) by pulling out the rubber stopper (if present).

At a residual thickness

a:	for riveted pads	5 mm
	(N 2504)	3 mm
b:	for adhesive pads	2 mm

the brake pad must be replaced.

Reinsert the rubber tab.

Brake adjustment

Depending on use, the wear and function of the brakes must be constantly checked and, if necessary, readjustment must be carried out. Readjustment is required after using approx. 2/3 of the max. cylinder stroke for emergency braking. To do this, jack up the axle and secure it against unintended movement.

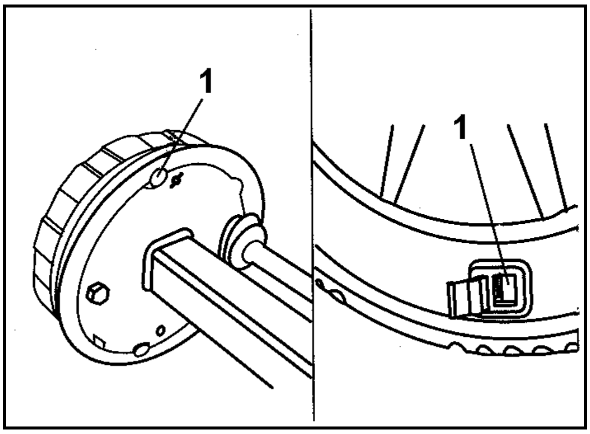


Fig. 154

Adjustment on linkage adjuster (workshop work)

Move the linkage adjuster by hand in the pressure direction. If the free travel of the long-stroke diaphragm cylinder pressure rod is max. 35 mm, the wheel brake must be readjusted.

Adjustments are made using the readjustment hexagon bolt on the linkage adjuster. Set the free travel "a" to 10-12 % of the connected brake lever length "B",
e.g. lever length 150 mm = free travel 15 – 18 mm.

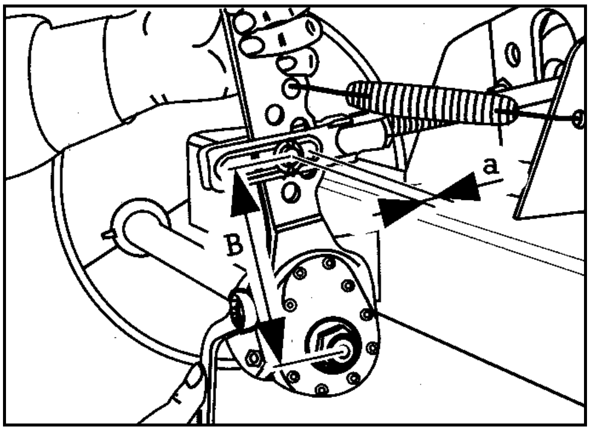


Fig. 155

Adjustment on automatic linkage adjuster (workshop work)

Basic settings are made in the same way as for the standard linkage adjuster. Readjustment occurs automatically at a cam rotation of approx. 15°.

The ideal lever position (which cannot be altered owing to the attachment of the cylinder) is approx. 15° before perpendicularity, and the same in the actuation direction.

Checking the function of the automatic linkage adjuster

1. Remove the rubber stopper cap.
2. Slacken the adjusting screw (arrow) with a ring spanner approx. ¾ of a turn anti-clockwise. There must be a free travel of at least 50 mm for a lever length of 150 mm.
3. Actuate the brake lever several times by hand. This should cause a smooth automatic readjustment; it should be possible to hear the coupling engaging and, on the back stroke, the adjusting screw should turn clockwise slightly.
4. Refit the stopper cap.
5. Lubricate with BPW ECO_Li91 special high melting point grease.

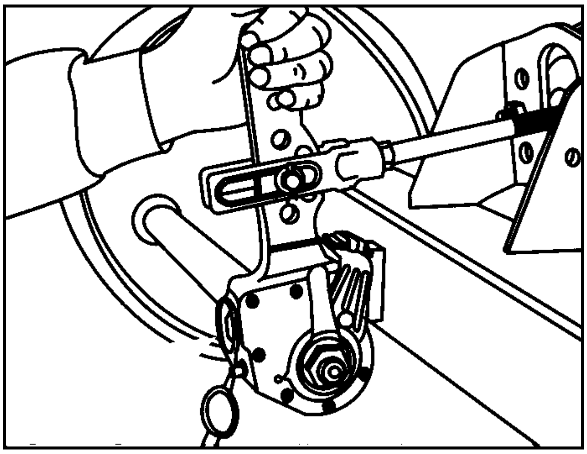


Fig. 156

Air reservoir

Drain the air reservoir every day.

Fig. 157/...

(1) Air reservoir

(2) Tensioning belts

(3) Drainage valve

(4) Test connection for pressure gauge.

1. Pull the drain valve (3) in a sideways direction using the ring until no more water escapes from the air reservoir (1).

→ Water flows out of the drain valve (3).

2. Unscrew the drain valve (3) from the air reservoir and clean the reservoir if there are signs of dirt.

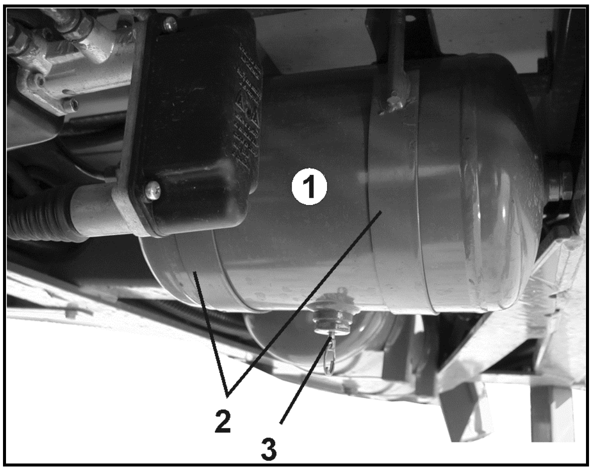


Fig. 157

Line filter

- **Change damaged filter inserts.**

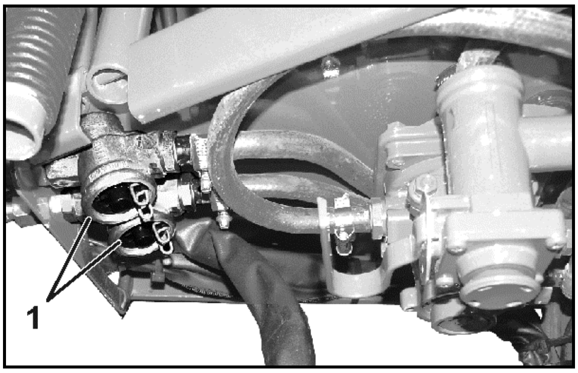


Fig. 158

1. Press together the locking piece on the two lugs.
2. Remove the locking piece with O-ring, pressure spring and filter insert.
3. Clean (rinse out) the filter insert with petrol or thinner and blow dry with compressed air.
4. To reassemble, reverse the procedure and make sure that the O-ring is not twisted in the guide slot.
5. Insert the locking piece with O-ring, pressure spring and filter insert.

When inserting the locking piece, make sure that the O-ring is not twisted in the guide slot.

12.6.1 Inspection instructions for dual-line service brake system (workshop work)

1. Leak tightness check

1. Check all connections, pipe lines, hose lines and screw connections for leak tightness.
2. Remedy leakages.
3. Repair any areas of chafing on pipes and hoses.
4. Replace porous and defective hoses.
5. The dual-circuit service brake system may be considered leakproof if the drop in pressure is no more than 0.15 bar after 10 minutes.
6. Seal any leaking areas or replace leaking valves.

2. Checking the pressure in the air reservoir

1. Connect a pressure gauge to the test connection on the air reservoir.

   Set value 6.0 to 8.1 $^{+0.2}$ bar

3. Checking the brake cylinder pressure

1. Connect a pressure gauge to the test connection on the brake cylinder.

   Set value: with brake not applied 0.0 bar

4. Visual inspection of the brake cylinder

1. Check the dust sleeves or gaiters for damage.
2. Replace damaged parts.

5. Joints on brake valves, brake cylinders and brake linkages

Joints on brake valves, brake cylinders and brake linkages must move freely. Grease or lightly oil, if necessary.

12.7 Parking brake

On new machines, the brake cables of the parking brake may stretch.

Readjust the parking brake,

- if three quarters of the spindle tensioning distance is required to firmly apply the parking brake.
- if you have just fitted new brake pads.

Adjusting the parking brake

When the parking brake is off, the brake cable must be slightly slack. However, the brake cable must not rest or chafe against other parts of the vehicle.

1. Release the cable clamps.
2. Shorten the brake cable as appropriate and retighten the cable clamps.
3. Check for the correct braking effect from the parking brake when applied.

12.8 Tyres / wheels

- **Required tightening torque for wheel nuts or bolts:**

  450 Nm

- Regularly check the
  - wheel nuts for firm seating.
  - tyre pressure (for information on this, see unterhalb).
- Only use the tyres and wheels which we have specified, see Seite 51.
- Repair work on tyres must only be carried out by specialists using suitable assembly tools.
- Tyre fitting requires sufficient skills and proper assembly tools.
- Use the jack only at the jacking points indicated.

12.8.1 Tyre pressures

- The required tyre pressure is dependent on
  - tyre size.
  - tyre loading capacity.
  - speed.
- The operational performance of the tyres is reduced
  - by overloading.
  - if tyre pressure is too low.
  - if tyre pressure is too high.

- Check tyre pressures regularly when the tyres are cold, i.e. before starting a run (see Seite 51).
- The difference in pressure between the tyres on one axle must be no greater than 0.1 bar.
- Tyre pressure can be raised by up to 1 bar after a fast run or in warm weather. Tyre pressure should on no account be reduced as it is then too low when the tyres cool down.

12.8.2 Fitting tyres (workshop work)

- Remove any instances of corrosion from the wheel rim seating surfaces before fitting a new / another tyre. Corrosion can cause damage to the wheel rims when the vehicle is in operation.
- When fitting new tyres, always use new valves for tubeless tyres or new inner tubes.
- Always fit the valves with valve caps which have a gasket insert.

Fitting tyres:

To jack up the machine for tyre changes, place the jack at the jacking point indicated (Fig. 159/1).

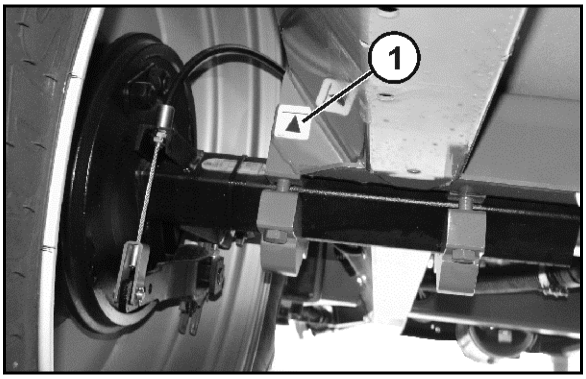


Fig. 159

12.9 Hydraulic system

WARNING

Risk of infection through the high pressure hydraulic fluid of the hydraulic system entering the body.

- Only a specialist workshop may carry out work on the hydraulic system.
- Depressurise the hydraulic system before carrying out work on the hydraulic system.
- When searching for leak points, always use suitable aids.
- Never attempt to plug leaks in hydraulic hose lines with the hand or fingers.

  Escaping high pressure fluid (hydraulic fluid) may pass through the skin and ingress into the body, causing serious injuries.

  If you are injured by hydraulic fluid, contact a doctor immediately. Risk of infection

- When connecting the hydraulic hose lines to the hydraulic system of connected machines, ensure that the hydraulic system is depressurised on both the drawing vehicle and the trailer.
- Ensure that the hydraulic hose lines are connected correctly.
- Regularly check all the hydraulic hose lines and couplings for damage and impurities.
- Have the hydraulic hose lines checked at least once a year by a specialist for proper functioning.
- Replace the hydraulic hose lines if they are damaged or worn. Only use AMAZONE original hydraulic hose lines.
- The hydraulic hose lines should not be used for longer than six years. This period includes any storage time of a maximum of two years. Even with proper storage and approved use, hoses and hose connections are subject to natural ageing, thus limiting the length of use. However, it may be possible to specify the length of use from experience values, in particular when taking the risk potential into account. In the case of hoses and hose connections made from thermoplastics, other guide values may be decisive.
- Dispose of old oil in the correct way. If you have problems with disposal, contact your oil supplier.
- Keep hydraulic fluid out of the reach of children!
- Ensure that no hydraulic fluid enters the soil or waterways.

12.9.1 Labelling hydraulic hose lines

Valve chest identification provides the following information:

Fig. 160/...

(1) Manufacturer's marking on the hydraulic hose line (A1HF)

(2) Date of manufacture of hydraulic hose line (04 / 02 = year / month = February 2004)

(3) Maximum approved operating pressure (210 BAR).

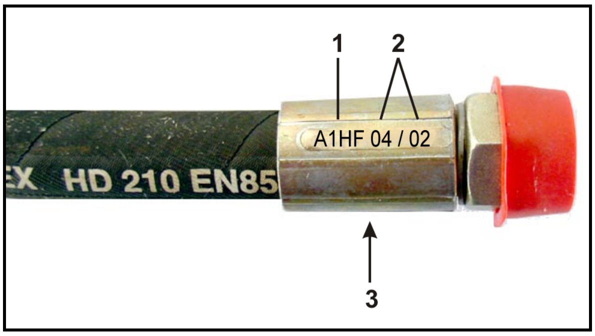


Fig. 160

12.9.2 Maintenance intervals

After the first 10 operating hours, and then every 50 operating hours

1. Check all the components of the hydraulic system for tightness.
2. If necessary, tighten screw unions.

Before each start-up:

1. Check the hydraulic hose lines for visible damage.
2. Repair any areas of chafing on hydraulic hose lines and pipes.
3. Replace any worn or damaged hydraulic hose lines immediately.

12.9.3 Inspection criteria for hydraulic hose lines

For your own safety and in order to reduce pollution, ensure the following inspection criteria.

Replace hoses if the respective hose fulfils at least one of the following criteria:

- Damage to the outer layer up to the ply (e.g. scouring points, cuts, cracks).
- Brittleness of the outer layer (crack formation of the hose material).
- Deformations which do not match the natural shape of the hose. Both in a depressurised and pressurised state or when bent (e.g. layer separation, bubble formation, pinching, bends).
- Leak points.
- Installation requirements not complied with.
- Life span of 6 years has been exceeded.

  The date of manufacture of the hydraulic hose line on the assembly is decisive for determining these six years. If the date of manufacture on the assembly is "2004", then the hose should not be used beyond February 2010. See also "Labelling of hydraulic hose lines".

Common causes for leaking hoses / pipes and connection pieces include:

- missing O-rings or seals
- damaged or badly fitting O-rings
- brittle or deformed O-rings or seals
- foreign bodies
- badly fitting hose clips

12.9.4 Installation and removal of hydraulic hose lines

Use

- only genuine AMAZONE replacement hoses. These hoses stand up to chemical, mechanical and thermal loads.
- hose clips made from V2A for fitting hoses, as a rule.

When installing and removing hydraulic hose lines, always observe the following information:

- Ensure cleanliness.• Always install the hydraulic hose lines to ensure the following in all operating positions
  - There is no tension, apart from the hose's own weight.
  - There is no possibility of jolting on short lengths.
  - External mechanical influences on the hydraulic hose lines are avoided.

    Use appropriate arrangements and fixing to prevent any scouring of the hoses on components or on each other. If necessary, secure hydraulic hose lines using protective covers. Cover sharp-edged components.
  - The approved bending radii may not be exceeded.

- When connecting a hydraulic hose line to moving parts, the hose length must be appropriate so that the smallest approved bending radius is not undershot over the whole area of movement and/or the hydraulic hose line is not overtensioned.
- Fix the hydraulic hose lines at the specified fixing points. There, avoid hose clips, which impair the natural movement and length changes of the hose.
- The coating of hydraulic hose lines is not permitted.

12.9.5 Fluid filter

- Oil filter for Profi-folding

Hydraulic fluid filter (Fig. 161/1) with contamination indicator (Fig. 161/2).

- Green Filter fully functional
- Red Replace filter

To remove the filter, twist off the filter cover and remove the filter.

CAUTION

Beforehand, depressurise the hydraulic system.

Otherwise there is a risk of injury from hydraulic fluid escaping at high pressure.

After replacing the filter, press the contamination indicator back into place.

→ Green ring again visible.

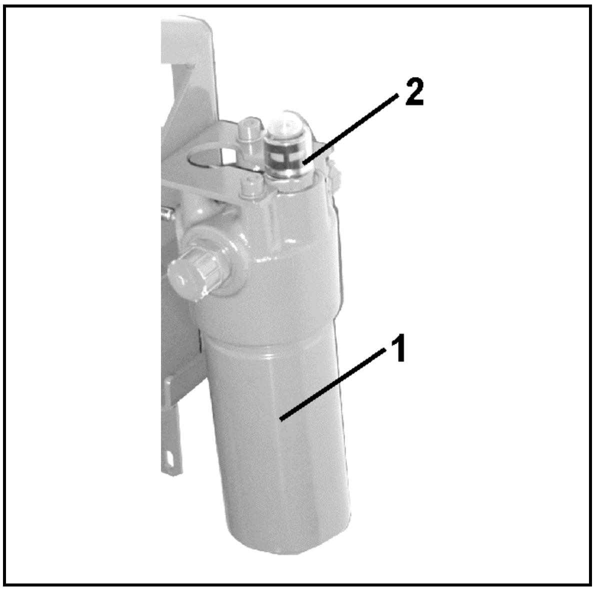


Fig. 161

12.9.6 Cleaning the solenoid valves

- hydraulic block for Profi-folding

To eliminate impurities from the solenoid valves, they must be flushed through. This may be necessary if deposit prevent the slider fully opening or closing.

1. Unscrew the magnetic cap (Fig. 162/1) abschrauben.
2. Remove the solenoid (Fig. 162/2) abnehmen.
3. Unscrew the valve rod (Fig. 162/3) with valve seats and clean with compressed air or hydraulic fluid

CAUTION

Beforehand, depressurise the hydraulic system.

Otherwise there is a risk of injury from hydraulic fluid escaping at high pressure.

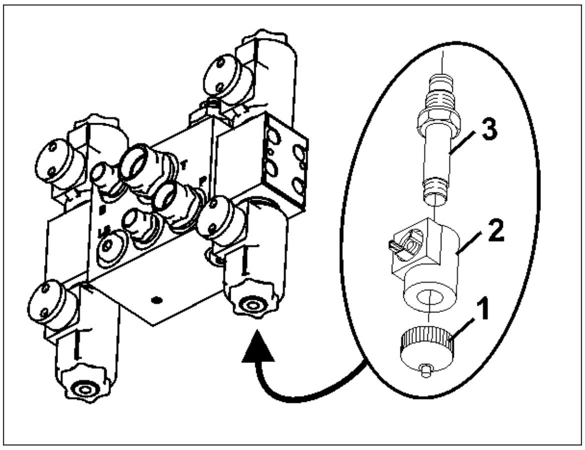


Fig. 162

12.9.7 Clean / exchange the filter in the hydraulic plug

Not with Profi-folding.

The hydraulic plugs are equipped with a filter (Fig. 160/1) that may block and then have to be cleaned / exchanged.

This is the case when the hydraulic functions run slower.

1. Unscrew the hydraulic plug from the filter housing.
2. Remove the filter with compression spring.
3. Clean / exchange the filter.
4. Re-fit the filter and compression spring correctly.
5. Screw back on the hydraulic plug. In doing so, observe the correct seating of the O-ring seal.

CAUTION

Danger of injuries from escaping hydraulic oil at high pressure!

Work on the hydraulic system only in a depressurized state.

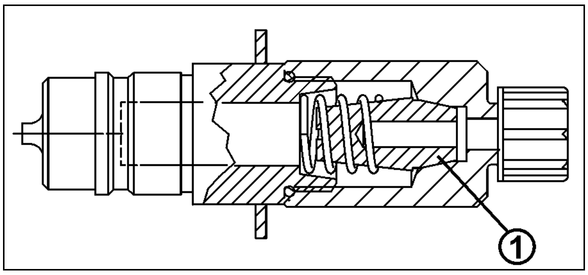


Fig. 163

12.9.8 Adjusting the hydraulic throttle valve

The operating speeds for the individual hydraulic functions are set at the factory from the valve block using the respective hydraulic throttle valves (fold/unfold sprayer boom, lock/unlock the swing compensation, etc.). However, depending on the type of tractor, it may be necessary to correct these speed settings.

The operating speed for a hydraulic function associated with a particular throttle pair can be adjusted by screwing the hexagon socket head screw on the corresponding throttle in or out.

- Reduce operating speed = screw in hexagon socket head screw.
- Increase operating speed = screw out hexagon socket head screw.

Always adjust the two throttles in a throttle pair equally when correcting the operating speed of a hydraulic function.

Folding via the tractor control unit

Fig. 164/…

(1) Hydraulic throttle valve - Height adjustment.

(2) Hydraulic throttle valve - Fold in the left boom extension.

(3) Hydraulic throttle valve - Fold in the right boom extension.

(4) Hydraulic throttle valve - Lock and unlock the swing compensation.

Fig. 165/…

(5) Hydraulic throttle valve - Fold out the boom extension.

(6) Hydraulic throttle valve - Fold in the boom extension.

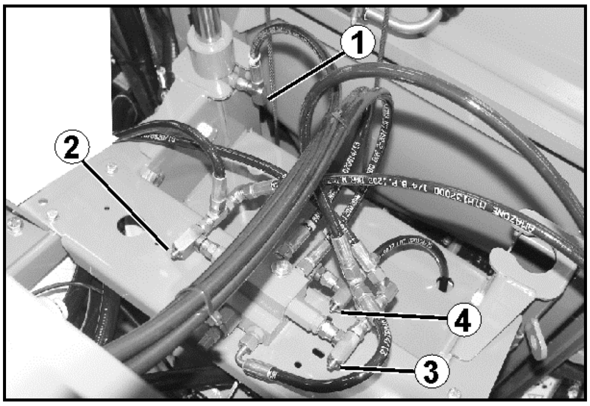


Fig. 164

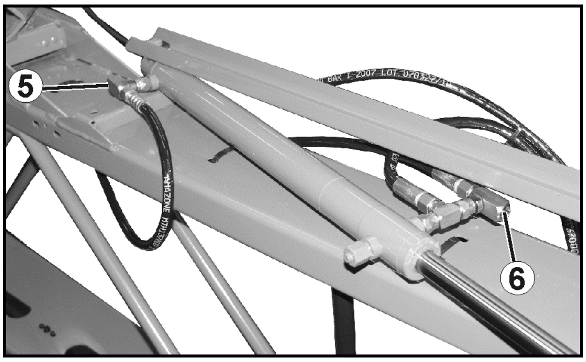


Fig. 165

Profi-folding I

Fig. 166/...

(1) Throttle - fold in the right-hand boom.

(2) Throttle - fold out the right-hand boom.

(3) Throttle - lock the swing compensation.

(4) Throttle transport safety catch.

(5) Hydraulic joints – tilt adjustment (the throttles are located on the hydraulic cylinder for tilt adjustment).

(6) Throttle - fold in the left-hand boom.

(7) Throttle - fold-out the left-hand boom.

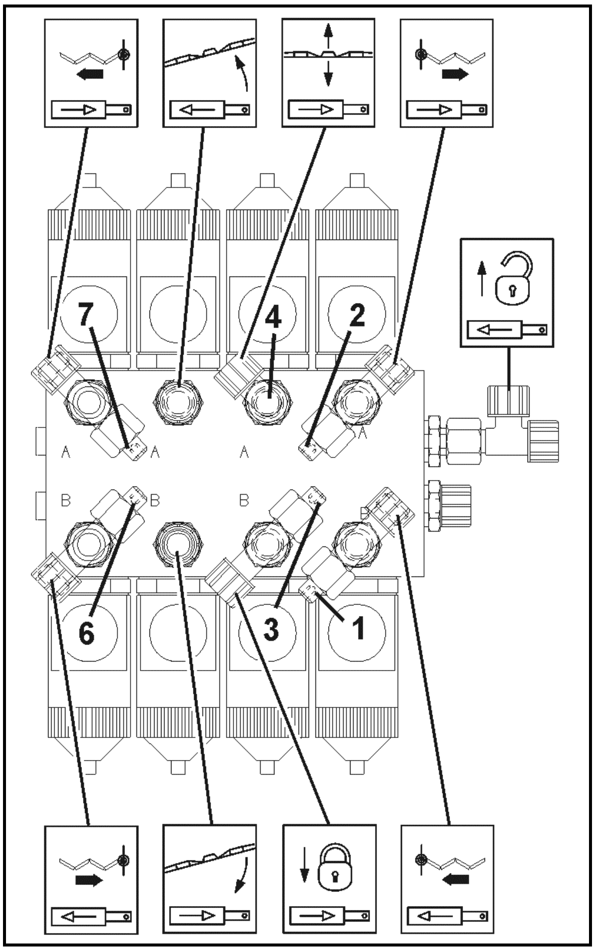


Fig. 166

Profi-folding II

Fig. 167/...

(1) Throttle - lower the right-hand boom.

(2) Throttle - raise the right-hand boom.

(3) Throttle - fold in the right-hand boom.

(4) Throttle - fold out the right-hand boom.

(5) Throttle - lock the swing compensation.

(6) Throttle transport safety catch.

(7) Hydraulic joints – tilt adjustment (the throttles are located on the hydraulic cylinder for tilt adjustment).

(8) Throttle - fold in the left-hand boom.

(9) Throttle - fold-out the left-hand boom.

(10) Throttle - lower the left-hand boom.

(11) Throttle - raise the left-hand boom.

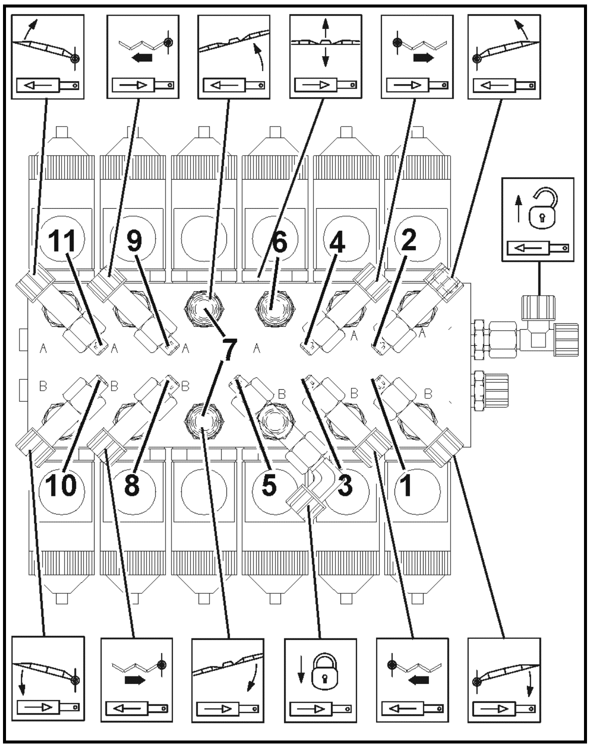


Fig. 167

12.10 Adjustments on the folded-out sprayer boom

Alignment parallel to the ground

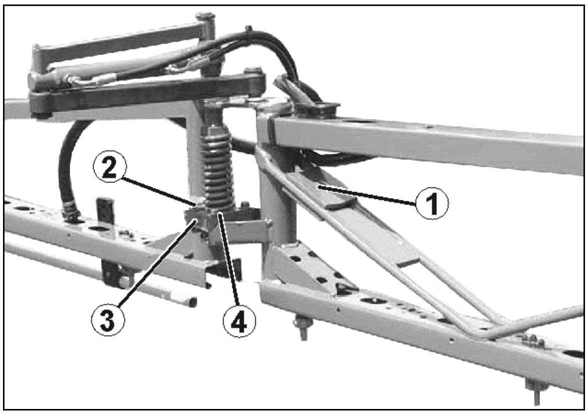


Fig. 168

With the sprayer boom folded out and correctly set, all the spraying nozzles must be of the same parallel distance to the ground.

If this is not the case, with the swing compensation **unlocked** align the folded-out sprayer boom by means of counterweights (Fig. 168/1). Secure the counterweights to the boom extension accordingly.

Horizontal alignment

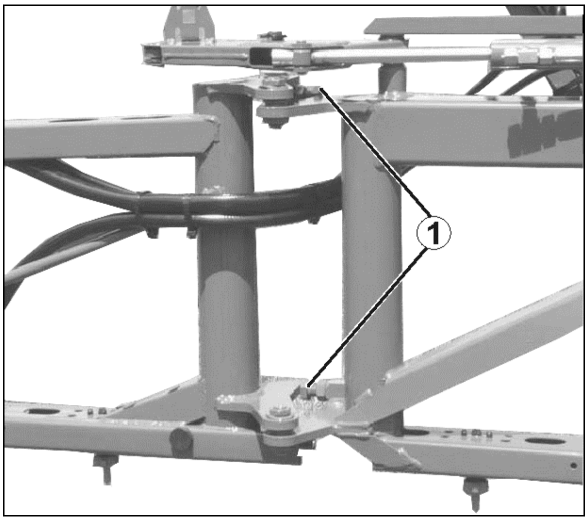


Fig. 169

Viewed in the direction of travel, all boom sections of the sprayer boom must be flush in line. Horizontal alignment may be necessary

- after a long period of use
- or in the event of rough contact between the ground and the sprayer boom.

Inner boom section

1. Release the lock nut of the adjusting screw (Fig. 169/1).
2. Turn the adjusting screw against the stops until the inner boom is flush with the sprayer boom middle section.
3. Tighten the lock nut.

Outer boom section

1. Release the screws (Fig. 168/2) of the securing link (Fig. 168/3). The boom is aligned directly at the plastic catch (Fig. 168/4) through the slotted holes of the securing link.
2. Align the boom section.
3. Tighten the screws (Fig. 168/2).

12.11 Pump

12.11.1 Check the oil level

- Only use 20W30 branded oil or 15W40 multi purpose oil.
- Ensure the correct oil level. Damage may be caused both by the oil level being too low or too high.
- The read-off oil level can be averaged from the non-horizontal orientation of the pump in the hitch drawbar.
- Foam generation and cloudy oil are signs of a faulty pump membrane.

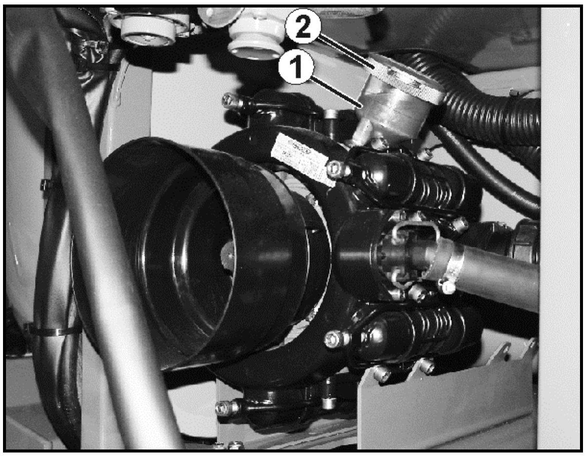


Fig. 170

1. Check whether the oil level is visible at the mark (Fig. 170/1) with the pump not running and standing on a flat surface.
2. If the oil level is not visible at the mark (Fig. 170/1), remove the lid (Fig. 170/2) and top up with oil.

12.11.2 Changing the oil

After a few operating hours, check the oil level; top up if necessary.

1. Remove the pump.
2. Remove the lid (Fig. 170/2).
3. Drain the oil.
    3.1 Turn the pump on its head.
    3.2 Rotate the drive shaft by hand until the used oil has all run out.

    The option also exists to drain the oil from the drain plug. However, with this procedure a slight oil residue remains in the pump; we therefore recommend the first approach.
4. Place the pump on an even surface.
5. Turn the drive shaft left and right alternately and slowly fill with new oil. The right quantity of oil has been reached when the oil is visible at the mark (Fig. 170/1).

12.11.3 Cleaning

After each use, thoroughly clean the pump by pumping clear fresh water for several minutes.

12.11.4 Check and replace suction and pressure valves (workshop work)

- Pay attention to the respective installation positions of the valves on the suction and pressure sides before removing the valve groups (Fig. 171/5).
- When reassembling, ensure that the valve guide (Fig. 171/9) is not damaged. Damage may cause the valves to jam.
- Always tighten the nuts (Fig. 171/1,2) in a crosswise fashion using the specified torque. Improper tightening of the screws causes warping, which results in leaks.

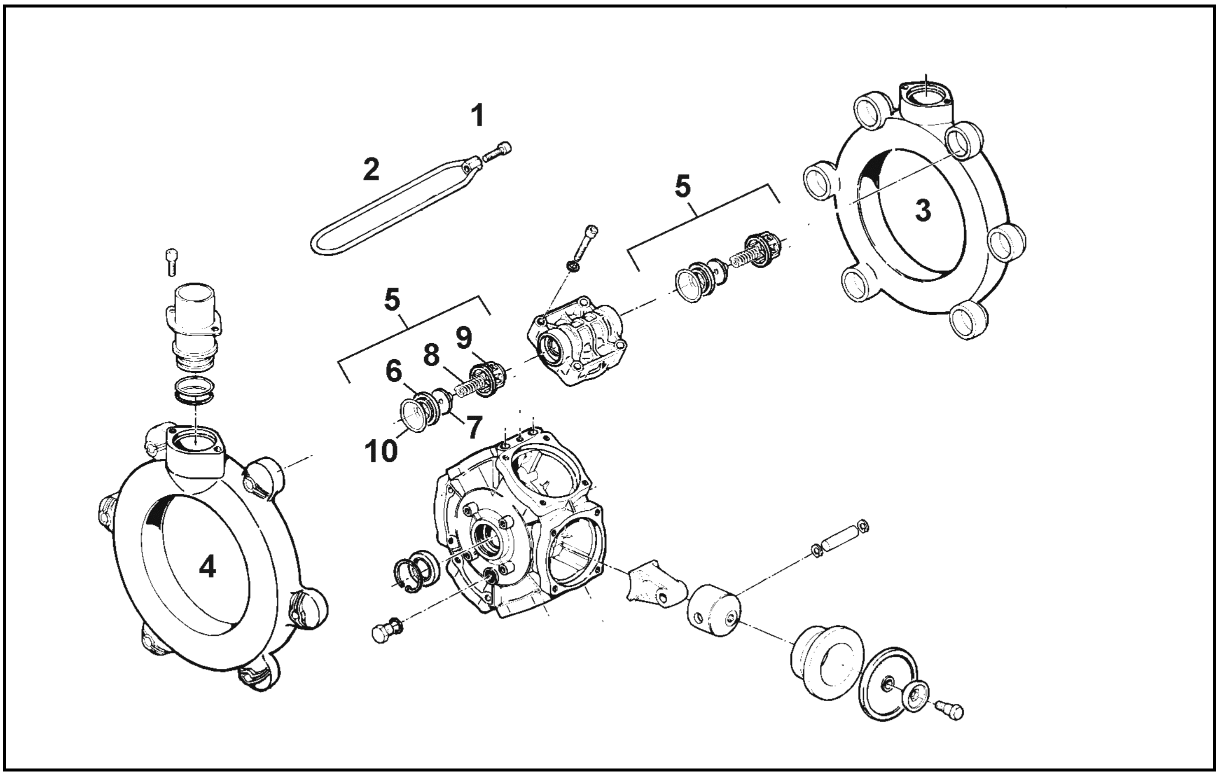


Fig. 171

1. Remove the pump.
2. Release the screws (Fig. 171/1) and remove the tensioning clamp (Fig. 171/2).
3. Remove the suction and pressure ports (Fig. 171/3 and Fig. 171/4).
4. Remove the valve groups (Fig. 171/5).
5. Check the valve seat (Fig. 171/6), valve (Fig. 171/7), valve spring (Fig. 171/8) and valve guide (Fig. 171/9) for damage or wear.
6. Remove the O-ring (Fig. 171/10).
7. Replace defective parts.
8. After testing and cleaning, fit the valve groups (Fig. 171/5).
9. Fit new O-rings (Fig. 171/10).
10. Mount the suction (Fig. 171/3) and pressure ports (Fig. 171/4) on the pump housing and fit the tensioning clamp (Fig. 171/2).
11. Tighten the screws (Fig. 171/1) crosswise to **11 Nm** torque

12.11.5 Checking and replacing piston diaphragms (workshop work)

- At least once a year, check that the piston diaphragm (Fig. 172/8) is in perfect condition by removing it.
- Pay attention to the respective installation positions of the valves on the suction and pressure sides before removing the valve groups (Fig. 172/5).
- Check and replace the piston diaphragm for each piston individually. Only remove the next piston in sequence after the currently removed piston has been completely checked and refitted.
- Always swivel the piston to be checked upwards so that the oil in the pump housing does not run out.
- As a rule, replace all piston diaphragms (Fig. 172/8), even if only one piston diaphragm distorted, punctured or porous.

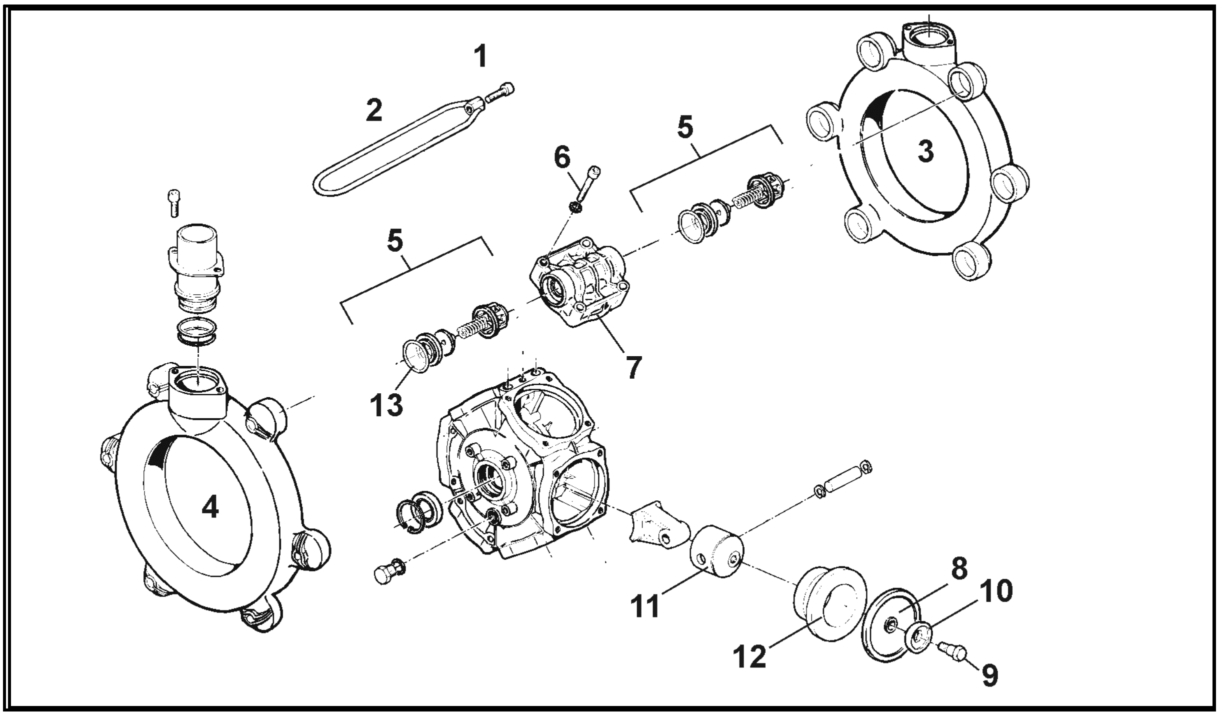


Fig. 172

Checking the piston diaphragm

1. Remove the pump.
2. Release the screws (Fig. 172/1) and remove the tensioning clamp (Fig. 172/2).
3. Remove the suction and pressure ports (Fig. 172/3, Fig. 172/4) including the valve groups (Fig. 172/5).

Pay attention to the installation position of the valves on the suction and pressure sides!

4. After removing the screws (Fig. 172/6), remove the cylinder head (Fig. 172/7).
5. Check the piston diaphragm (Fig. 172/8).

Replacing the piston diaphragm

- Ensure the correct position for the recesses and/or holes on the hydraulic cylinders.
- Secure the piston diaphragm (Fig. 172/8) with a washer disc and a screw (Fig. 172/11) on the piston (Fig. 172/9), so that the rim shows on the cylinder head side (Fig. 172/7).
- Always tighten the nuts (Fig. 172/1,2) in a crosswise fashion using the specified torque. Improper tightening of the screws causes warping, which results in leaks.

1. Undo the screw (Fig. 172/11) and remove the piston diaphragm (Fig. 172/8) and the washer disc from the piston (Fig. 172/9).
2. If the piston diaphragm has been punctured, drain the oil/spray liquid mixture from the pump housing.
3. Remove the hydraulic cylinder (Fig. 172/10) from the pump housing.
4. Clean the pump housing by flushing it thoroughly with diesel oil or paraffin.
5. Clean all sealing faces.
6. Insert the cylinder (Fig. 172/10) back into the pump housing.
7. Fit the piston diaphragm (Fig. 172/8).
8. Mount the cylinder head (Fig. 172/7) on the pump housing and tighten the screws (Fig. 172/6) an equal amount in a crosswise fashion.

   Use adhesive for medium tight screw connections for the screw connection!
9. After testing and cleaning, fit the valve groups (Fig. 172/5).
10. Insert new O-rings.
11. Mount the suction (Fig. 172/3) and pressure port (Fig. 172/4) on the pump housing.
12. Tighten the nuts (Fig. 172/1,2) in a crosswise fashion using a torque of **11 Nm**.

12.12 Calibrate the flow meter

For this purpose, observe the operating manual Software ISOBUS chapter "Pulses per litre".

12.13 Field sprayer calibration

Test the field sprayer by carrying out calibration

- **before the start of the season.**
- **each time a nozzle is changed.**
- **to check the setting information in the spray tables.**
- **in the case of deviations between the actual and required spray rate [l/ha].**

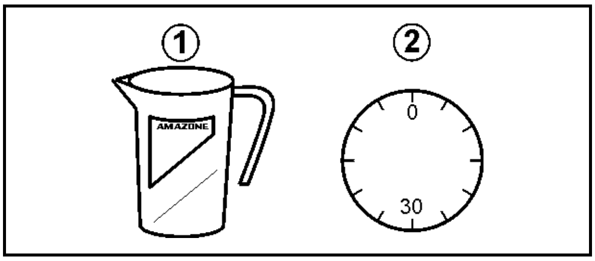
Any deviations between the actual and required spray rate [l/ha] may be caused by:

- the difference between the actual operational speed and that indicated on the tractor meter and/or
- natural wear to the spraying nozzles.

Calibration equipment:

(1) Quick-check beaker

(2) Stopwatch



Determining the actual spray rate while stationary via the individual nozzle output

Determine the nozzle output from at least 3 different nozzles. To do this, check one nozzle on the left boom, one on the right boom and one in the middle of the sprayer boom as described below.

1. Determine the precise spray rate [l/ha] required for the crop protection measure.
2. Determine the required spray pressure.
3. Control terminal / AMASPRAY$^+$:
   - 3.1 Enter the required spray rate into the operating terminal.
   - 3.2 Enter the permissible spray pressure range for the spraying nozzles fitted to the sprayer boom on the operating terminal.
   - 3.3 Switch the operating terminal from AUTOMATIC mode over to the MANUAL mode.
4. Fill the spray liquid tank with water.
5. Switch on the agitator.
6. Manually set the required spray pressure.
7. Switch on spraying and check that all nozzles are functioning perfectly.
8. Calculate the individual nozzle output [l/min] at several nozzles.

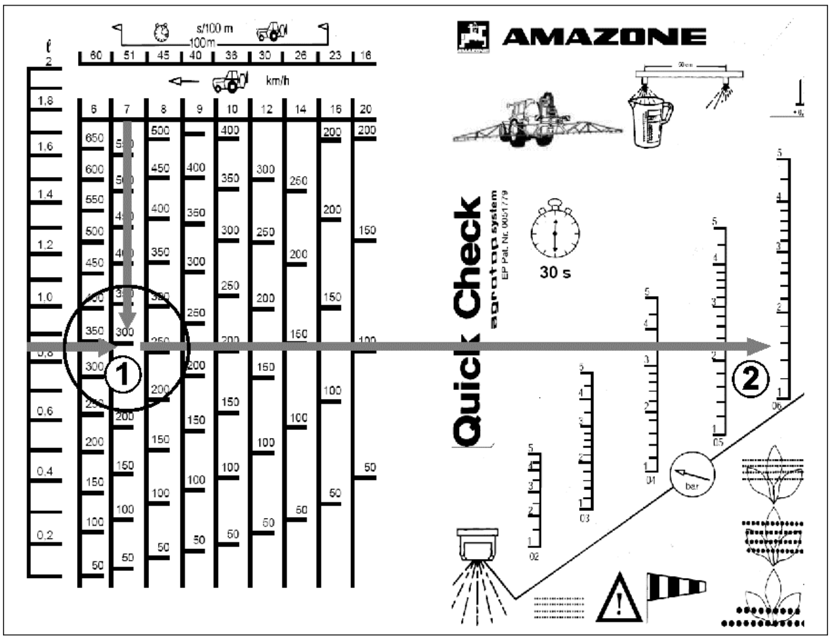
   To do so, hold the quick-check beaker under a nozzle for precisely 30 seconds.
9. Switch off spraying.
10. Calculate the average individual nozzle output [l/ha].

- Using the table on the quick-check beaker.
- By calculation.
- Using the spray table.

Example:

Nozzle size	'06'
Intended operational speed	7 km/h
Nozzle output on the left boom:	0.85 l/30s
Nozzle output in the centre	0.84 l/30s
Nozzle output on the right boom:	0.86 l/30s
Calculated average value:	**0.85 l/30s → 1.7 l/min**

1. Calculate the individual nozzle output [l/ha] using the quick-check beaker



(1) →calculated spread rate 290 l/ha
(2) →calculated spray pressure 1.6 bar

2. Calculate individual nozzle output [l/ha]

$$\frac{d\ [\text{l/min}]\ \times\ 1200}{e\ [\text{km/h}]} = \text{Spread rate[l/ha]}$$

- d: Nozzle output (calculated average value) [l/min]
- e: Operational speed [km/h]

$$\frac{1.7\ [\text{l/min}]\ \times\ 1200}{7\ [\text{km/h}]} = 291\ [\text{l/ha}]$$

3. Read the individual nozzle output [l/ha] from the spray table

From the spray table (see page 230**):**

→ Spread rate 291 l/ha
→ Spray pressure 1.6 bar

If the calculated values for spread rate/spray pressure do not agree with the set values:

- Calibrate the flow meter (see the operating manual for the operator control terminal)
- Check all nozzles for wear and blockages.

12.14 Nozzles

From time to time, check the seating of the slider (Fig. 173/7).

- To do this, insert the slider into the nozzle body (Fig. 173/2) as far as possible using moderate thumb pressure.

Do not insert the slider up to the stop when in a new condition under any circumstances.

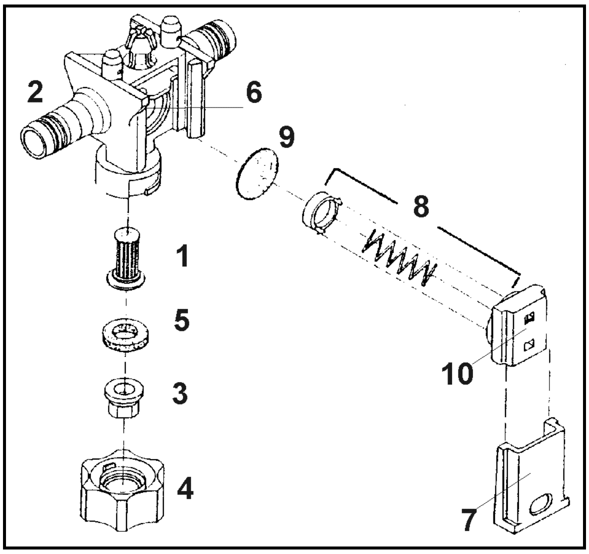


Fig. 173

12.14.1 Fitting the nozzle

1. Insert the nozzle filter (Fig. 173/1) into the nozzle body (Fig. 173/2) from below.
2. Insert the nozzle (Fig. 173/3) into the bayonet nut (Fig. 173/4)

Different coloured bayonet nuts are available for the different nozzles.

3. Insert the rubber seal (Fig. 173/5) above the nozzle.
4. Press a rubber seal into the seat for the bayonet nut.
5. Position a bayonet nut on the bayonet connection.
6. Screw on the bayonet nut up to the stop.

12.14.2 Removing the diaphragm valve if the nozzle is dripping

Deposits on the diaphragm seat (Fig. 173/6) can cause the nozzles to drip after the boom is shut-off. If this occurs, clean the diaphragm in question as follows:

1. Pull the slider (Fig. 173/7) out of the nozzle body (Fig. 173/2) towards the bayonet nut.
2. Remove the spring element (Fig. 173/8) and the diaphragm (Fig. 173/9).
3. Clean the diaphragm seat (Fig. 173/6).
4. Reassembly occurs in the reverse sequence.

Note the correct orientation for installing the spring element. For installation, the stepped, upwards-sloping edges on the left and right of the housing of the spring element (Fig. 173/10) must slope up in the direction of the boom profile.

12.15 Hose filters

- Clean the line filter (Fig. 174/1).
- Replace defective filter inserts.

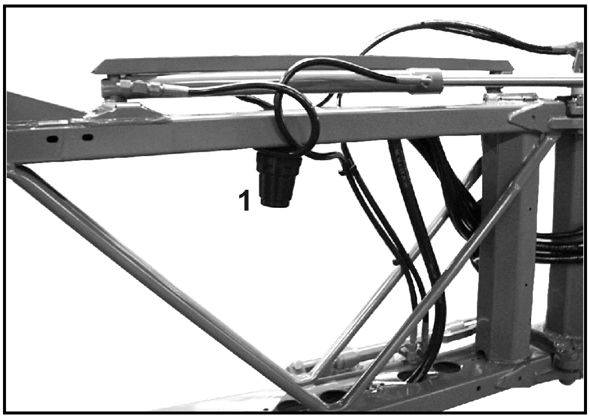


Fig. 174

12.16 Instructions on testing the field sprayer

- Only authorised centres are permitted to carry out spray tests.
- According to law, a spray test must be carried out:
    - 6 months after commissioning (if not performed at time of purchase) at the latest, then
    - every two years thereafter.

Field sprayer test kit (special equipment), order no.: 935680

Fig. 175/**...**

(1) Push-on cap (Order no.: 913 954) and connector (Order no.: ZF195)

(2) Flow meter connection (Order no.: 919967)

(3) Pressure gauge connection (Order no.: 7107000)

(4) O-Ring (Order no.: FC122)

(5) Hose connection (Order no.: GE095)
(6) Sleeve nut (Order no.: GE021)

(7) Hose clip (Order no.: KE006)

(8) Plug-in socket (Order no.: 919345)

(9) O-Ring (Order no.: FC112)

(10) Turned socket (Order no.: 935679)

(11) Securing plug (Order no.: ZF195)

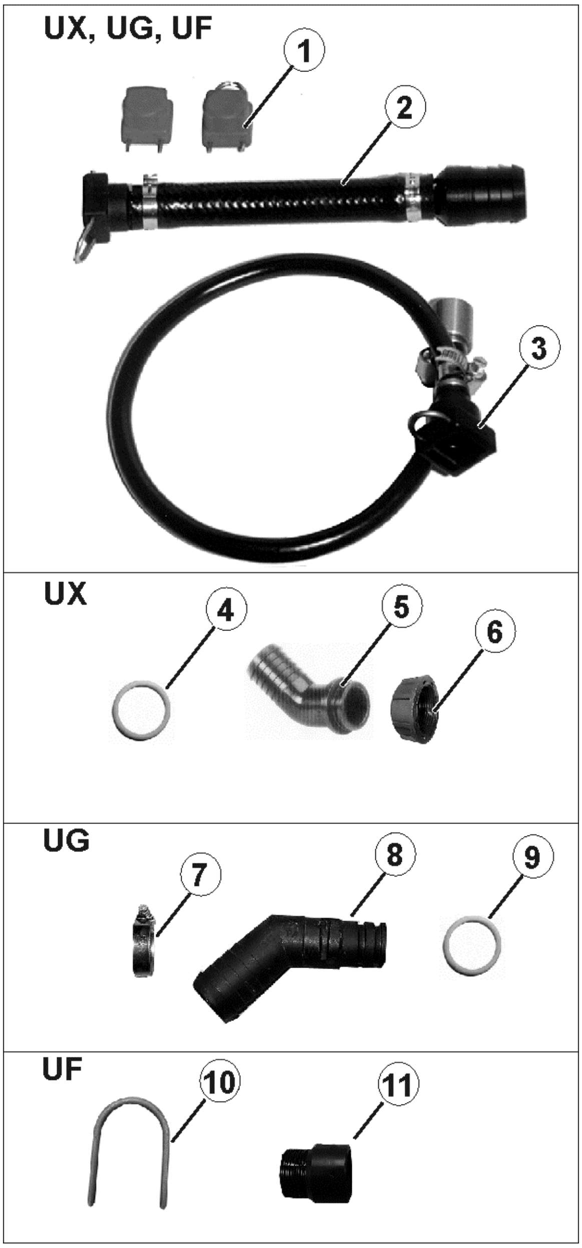


Fig. 175

Pump test - testing pump performance (delivery capacity, pressure)

Connect the test kit to the pump pressure connection (Fig. 176/1).

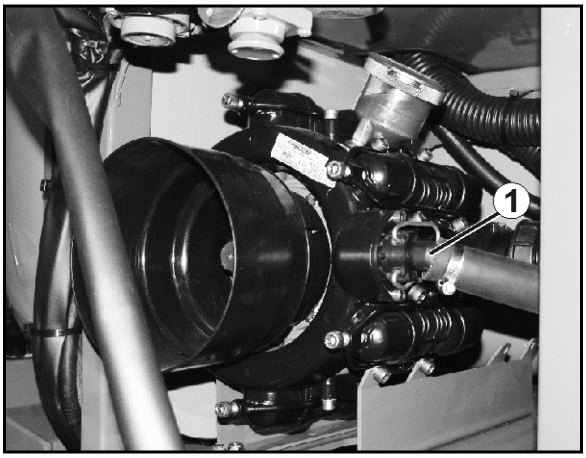


Fig. 176

Flow meter test

1. Remove all spray lines from the part width section valves (Fig. 177/1).
2. Connect the flow meter connection (Fig. 175/2) to a part width section valve and connect to the tester.
3. Block the connections for the remaining part width section valves using blanks (Fig. 175/1).
4. Switch on spraying.

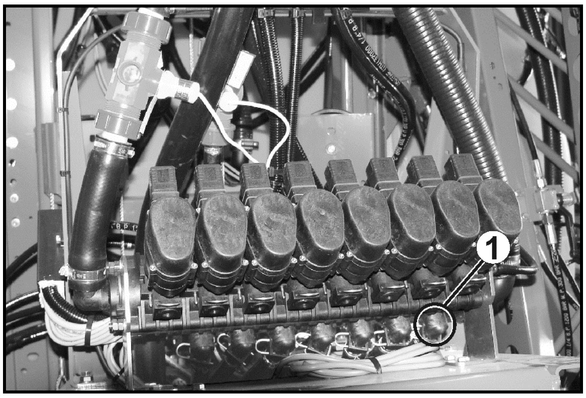


Fig. 177

Pressure gauge test

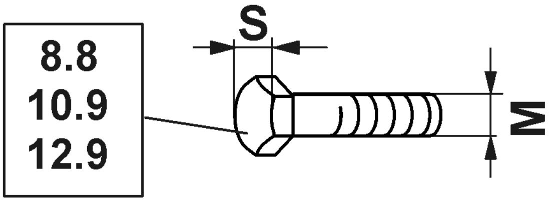
1. Remove a spray line from a part width section valve.
2. Connect the pressure gauge connection (Fig. 175/3) to a part width section valve with the help of the turned socket.
3. Screw the check gauge 1/4 of an inch into the inside thread.
4. Switch on spraying.

12.17 Electric lighting system

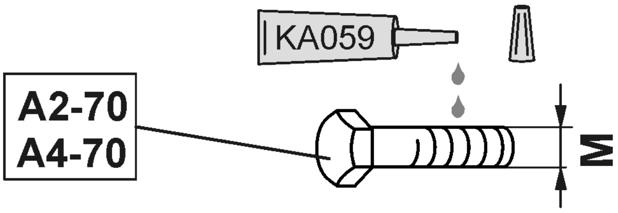
Replacement of light bulbs:

1. Unscrew the safety glass.
2. Remove the defective bulb.
3. Insert the replacement bulb (note the correct voltage and wattage).
4. Insert and screw on the sight glass.

12.18 Screw tightening torques



M	S		Nm	
		8.8	10.9	12.9
M 8	13	25	35	41
M 8x1		27	38	41
M 10	16 (17)	49	69	83
M 10x1		52	73	88
M 12	18 (19)	86	120	145
M 12x1,5		90	125	150
M 14	22	135	190	230
M 14x1,5		150	210	250
M 16	24	210	300	355
M 16x1,5		225	315	380
M 18	27	290	405	485
M 18x1,5		325	460	550
M 20	30	410	580	690
M 20x1,5		460	640	770
M 22	32	550	780	930
M 22x1,5		610	860	1050
M 24	36	710	1000	1200
M 24x2		780	1100	1300
M 27	41	1050	1500	1800
M 27x2		1150	1600	1950
M 30	46	1450	2000	2400
M 30x2		1600	2250	2700



M	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24
Nm	2,3	4,6	7,9	19,3	39	66	106	162	232	326	247	314

12.19 Disposing of the field sprayer

Carefully clean the whole field sprayer (inside and out) before disposing of the field sprayer.

The following components are eligible for energy recovery*: spray liquid tank, induction bowl, flushing water tank, fresh water tank, hoses and plastic fittings.

Metal parts can be scrapped.

Follow the statutory requirements for each individual material.

* Energy recovery

is the process of reclaiming the energy contained in plastics by burning them and using the energy released to generate electricity and/or steam or to supply process heat. Energy recovery is suitable for mixed and contaminated plastics, in particular for any plastics which have come into contact with pollutants.

13 Spray table

13.1 Flat-fan, anti-drift, injector and airmix nozzles, spraying height 50 cm

- The spray rates [l/ha] listed in the spray tables are only valid for water. To convert the spray rates given into AUS, multiply these by 0.88 and, for NP solutions, by 0.85.
- Fig. 178 helps with the selection of the right nozzle type. The nozzle type is determined by
  - the intended operational speed,
  - the required spray rate and
  - the required atomisation characteristic (fine, medium or coarse-dropped) of the crop protection agent used for the crop protection measure.
- Fig. 179 is used to
  - determine the nozzle size.
  - determine the required spray pressure.
  - determine the required individual nozzle output for calibrating the field sprayer.

Permissible pressure ranges for different nozzle types and sizes

Nozzle type	Manufacturer	Permissible pressure range [bar]	
		min. pressure	max. pressure
XRC	TeeJet	1	5
AD	Lechler	1,5	5
Air Mix	agrotop	1	6
IDK / IDKN	Lechler	1	6
ID3 0,1-0,15		3	8
ID3 0,2-0,8		2	8
AI	TeeJet	2	8
TTI		1	7
AVI Twin	agrotop	2	8
TD Hi Speed	agrotop	2	10

For further information about the nozzle characteristics, see the nozzle manufacturer's website.

www.agrotop.com / www.lechler-agri.de / www.teejet.com

Selecting the nozzle type

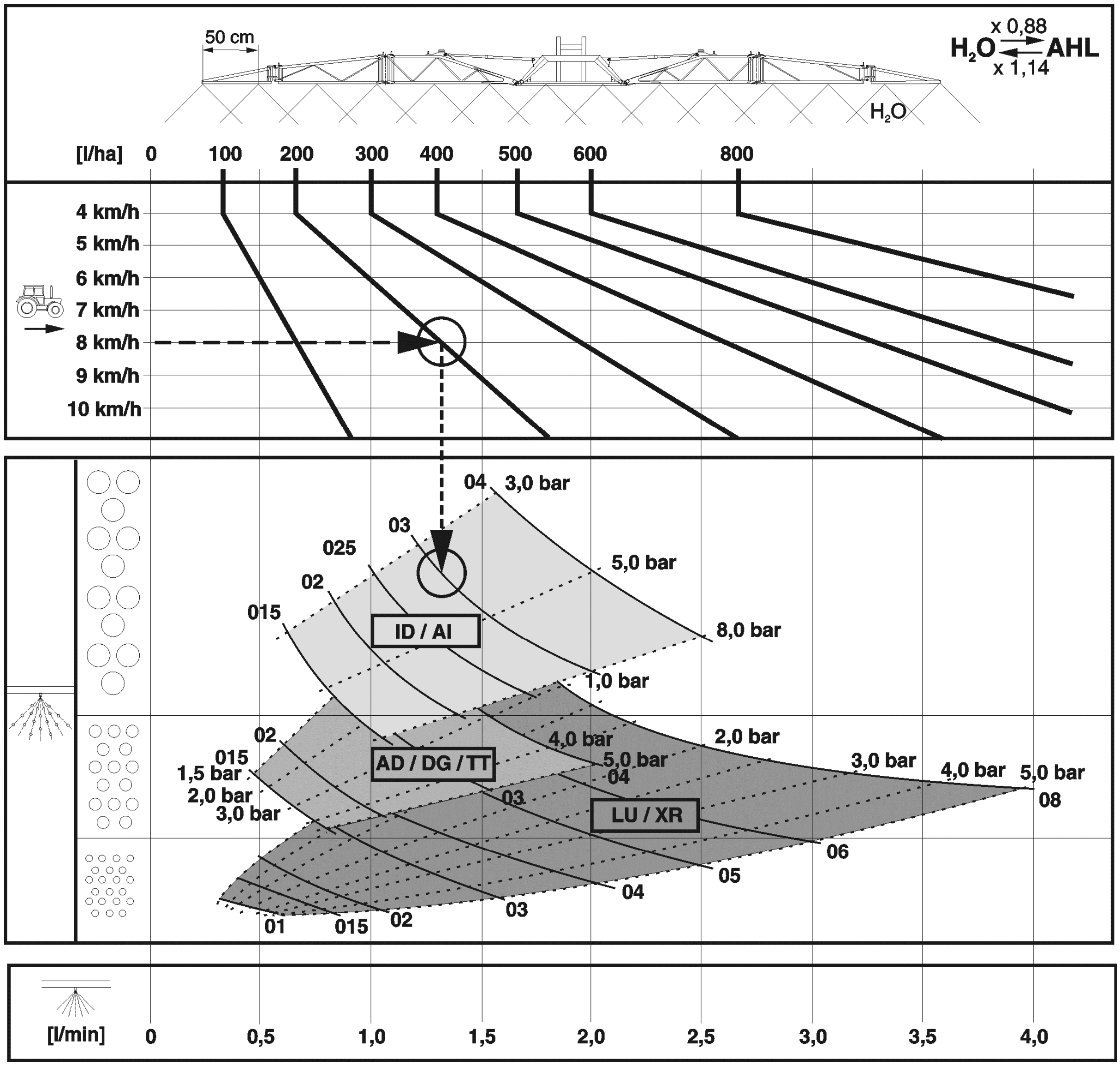


Fig. 178

Example:

Required spray rate:	**200 l/ha**
Intended operational speed:	**8 km/h**
Required atomisation characteristic for the crop protection measure:	**coarse-dropped** (fine drifting)
Required nozzle type:	?
Required nozzle size:	?
Required spray pressure:	? bar
Required individual nozzle output for calibrating the field sprayer:	? l/min

Determining the nozzle type, nozzle size, spray pressure and individual nozzle output

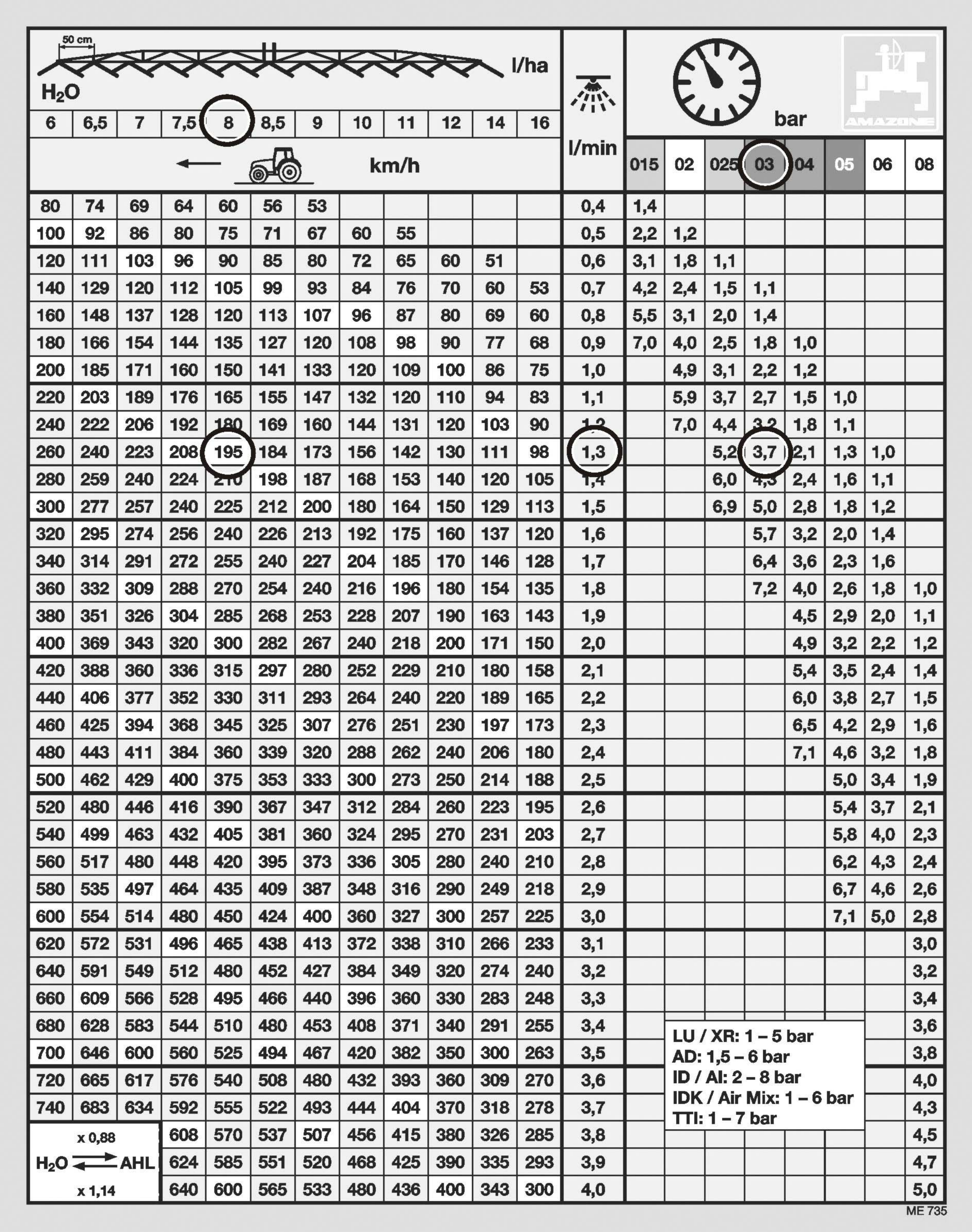
1. Determine the working point for the required spray rate (**200 l/ha**) and the intended operational speed (**8 km/h**).
2. At the working point, trace a line down the table. Depending on the position of the working point, this line will run through the cells for various nozzle types.
3. Select the best nozzle type for the crop protection measure in question, with reference to the required atomisation characteristic (fine, medium or coarse-dropped).

→ Nozzle choice for the example given above:

→ Nozzle type: **AI or ID**

4. Go to the spray table (**Fig. 179**).
5. In the column with the intended operational speed (**8 km/h**), find the required spray rate (**200 l/ha**) or a figure which is as close as possible to the required spray rate (in this case, for example, **195 l/ha**).
6. In the line with the required spray rate (**195 l/ha**),
   - read the nozzle sizes in question. Select a suitable nozzle size (e.g.**'03'**).
   - where the nozzle size column intersects with the selected nozzle size, read the required spray pressure (e.g. **3.7 bar**).
   - read the required individual nozzle output (**1.3 l/min**) for calibrating the field sprayer.

Required nozzle type:	**AI / ID**
Required nozzle size:	**'03'**
Required spray pressure:	**3.7 bar**
Required individual nozzle output for calibrating the field sprayer:	**1.3 l/min**


50 cm
l/ha
H_2O
km/h
l/min
bar
ME 735

6	6,5	7	7,5	8	8,5	9	10	11	12	14	16	l/min	015	02	025	03	04	05	06	08
80	74	69	64	60	56	53						0,4	1,4							
100	92	86	80	75	71	67	60	55				0,5	2,2	1,2						
120	111	103	96	90	85	80	72	65	60	51		0,6	3,1	1,8	1,1					
140	129	120	112	105	99	93	84	76	70	60	53	0,7	4,2	2,4	1,5	1,1				
160	148	137	128	120	113	107	96	87	80	69	60	0,8	5,5	3,1	2,0	1,4				
180	166	154	144	135	127	120	108	98	90	77	68	0,9	7,0	4,0	2,5	1,8	1,0			
200	185	171	160	150	141	133	120	109	100	86	75	1,0		4,9	3,1	2,2	1,2			
220	203	189	176	165	155	147	132	120	110	94	83	1,1		5,9	3,7	2,7	1,5	1,0		
240	222	206	192	180	169	160	144	131	120	103	90	1,2		7,0	4,4	3,2	1,8	1,1		
260	240	223	208	195	184	173	156	142	130	111	98	1,3			5,2	3,7	2,1	1,3	1,0	
280	259	240	224	210	198	187	168	153	140	120	105	1,4			6,0	4,3	2,4	1,6	1,1	
300	277	257	240	225	212	200	180	164	150	129	113	1,5			6,9	5,0	2,8	1,8	1,2	
320	295	274	256	240	226	213	192	175	160	137	120	1,6				5,7	3,2	2,0	1,4	
340	314	291	272	255	240	227	204	185	170	146	128	1,7				6,4	3,6	2,3	1,6	
360	332	309	288	270	254	240	216	196	180	154	135	1,8				7,2	4,0	2,6	1,8	1,0
380	351	326	304	285	268	253	228	207	190	163	143	1,9					4,5	2,9	2,0	1,1
400	369	343	320	300	282	267	240	218	200	171	150	2,0					4,9	3,2	2,2	1,2
420	388	360	336	315	297	280	252	229	210	180	158	2,1					5,4	3,5	2,4	1,4
440	406	377	352	330	311	293	264	240	220	189	165	2,2					6,0	3,8	2,7	1,5
460	425	394	368	345	325	307	276	251	230	197	173	2,3					6,5	4,2	2,9	1,6
480	443	411	384	360	339	320	288	262	240	206	180	2,4					7,1	4,6	3,2	1,8
500	462	429	400	375	353	333	300	273	250	214	188	2,5						5,0	3,4	1,9
520	480	446	416	390	367	347	312	284	260	223	195	2,6						5,4	3,7	2,1
540	499	463	432	405	381	360	324	295	270	231	203	2,7						5,8	4,0	2,3
560	517	480	448	420	395	373	336	305	280	240	210	2,8						6,2	4,3	2,4
580	535	497	464	435	409	387	348	316	290	249	218	2,9						6,7	4,6	2,6
600	554	514	480	450	424	400	360	327	300	257	225	3,0						7,1	5,0	2,8
620	572	531	496	465	438	413	372	338	310	266	233	3,1								3,0
640	591	549	512	480	452	427	384	349	320	274	240	3,2								3,2
660	609	566	528	495	466	440	396	360	330	283	248	3,3								3,4
680	628	583	544	510	480	453	408	371	340	291	255	3,4								3,6
700	646	600	560	525	494	467	420	382	350	300	263	3,5								3,8
720	665	617	576	540	508	480	432	393	360	309	270	3,6								4,0
740	683	634	592	555	522	493	444	404	370	318	278	3,7								4,3
x 0,88 H_2O ⇄ AHL x 1,14			608	570	537	507	456	415	380	326	285	3,8								4,5
			624	585	551	520	468	425	390	335	293	3,9								4,7
			640	600	565	533	480	436	400	343	300	4,0								5,0

LU / XR: 1 – 5 bar
AD: 1,5 – 6 bar
ID / AI: 2 – 8 bar
IDK / Air Mix: 1 – 6 bar
TTI: 1 – 7 bar

Fig. 179

13.2 Spraying nozzles for liquid manure

Nozzle type	Manufacturer	Permissible pressure range [bar]	
		min. pressure	max. pressure
3-jet	agrotop	2	8
7-hole	TeeJet	1.5	4
FD	Lechler	1.5	4
Drag hose	AMAZONE	1	4

13.2.1 Spray table for three-ray nozzles, spraying height 120 cm

AMAZONE - spray table for three-ray nozzles (yellow)

Pressure	Nozzle output		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.36	0.32	64	55	48	43	39	35	32	28	24
1.2	0.39	0.35	69	60	52	47	42	38	35	30	26
1.5	0.44	0.39	78	67	59	53	47	43	39	34	30
1.8	0.48	0.42	85	73	64	57	51	47	43	37	32
2.0	0.50	0.44	88	75	66	59	53	48	44	38	33
2.2	0.52	0.46	92	78	69	62	55	50	46	39	35
2.5	0.55	0.49	98	84	74	66	57	54	49	52	37
2.8	0.58	0.52	103	88	77	69	62	56	52	44	39
3.0	0.60	0.53	106	91	80	71	64	58	53	46	40

AMAZONE - spray table for three-ray nozzles (red)

Pressure	Nozzle output		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.61	0.54	108	93	81	72	65	59	54	47	41
1.2	0.67	0.59	118	101	88	78	70	64	59	51	44
1.5	0.75	0.66	132	114	99	88	79	72	66	57	50
1.8	0.79	0.69	138	119	104	92	83	76	69	60	52
2.0	0.81	0.71	142	122	107	95	85	78	71	61	54
2.2	0.84	0.74	147	126	111	98	88	80	74	63	56
2.5	0.89	0.78	155	133	117	104	93	84	78	67	59
2.8	0.93	0.82	163	140	122	109	98	87	82	70	61
3.0	0.96	0.84	168	144	126	112	101	92	84	72	63

AMAZONE - spray table for three-ray nozzles (blue)

Pressure	Nozzle output		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.86	0.76	152	130	114	101	91	83	76	65	57
1.2	0.94	0.83	166	142	124	110	99	91	83	71	62
1.5	1.05	0.93	186	159	140	124	112	102	93	80	70
1.8	1.11	0.98	196	167	147	131	117	107	98	84	74
2.0	1.15	1.01	202	173	152	135	121	110	101	87	76
2.2	1.20	1.06	212	182	159	141	127	116	106	91	80
2.5	1.26	1.12	224	192	168	149	135	122	112	96	84
2.8	1.32	1.17	234	201	176	156	141	128	117	101	88
3.0	1.36	1.20	240	206	180	160	144	131	120	103	90

AMAZONE - spray table for three-ray nozzles (white)

Pressure	Nozzle output		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	1.16	1.03	206	177	155	137	124	213	103	89	78
1.2	1.27	1.12	224	192	168	149	134	222	112	96	84
1.5	1.42	1.26	252	217	190	168	151	138	126	109	95
1.8	1.56	1.38	277	237	207	184	166	151	139	119	104
2.0	1.64	1.45	290	249	217	193	174	158	145	125	109
2.2	1.73	1.54	307	263	230	204	185	168	154	132	115
2.5	1.84	1.62	325	279	244	216	195	178	163	140	122
2.8	1.93	1.71	342	293	256	228	205	187	171	147	128
3.0	2.01	1.78	356	305	267	237	214	194	178	153	134

13.2.2 Spray table for 7-hole nozzles

AMAZONE spray table for 7-hole nozzle SJ7-02VP (yellow)

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	0.55	0.49	98	84	74	65	59	53	49	42	37
2.0	0.64	0.57	114	98	86	76	68	62	57	49	43
2.5	0.72	0.64	128	110	96	85	77	70	64	55	48
3.0	0.80	0.71	142	122	107	95	85	77	71	61	53
3.5	0.85	0.75	150	129	113	100	90	82	75	64	56
4.0	0.93	0.82	164	141	123	109	98	89	82	70	62

AMAZONE spray table for 7-hole nozzle SJ7-03VP (blue)

Pressure (bar)	Nozzle output per nozzle (l/min)		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
1.5	0.87	0.77	154	132	116	103	92	84	77	66	58
2.0	1.00	0.88	176	151	132	117	106	96	88	75	66
2.5	1.10	0.97	194	166	146	129	116	106	97	83	73
3.0	1.18	1.04	208	178	156	139	125	113	104	89	78
3.5	1.27	1.12	224	192	168	149	134	122	112	96	84
4.0	1.31	1.16	232	199	174	155	139	127	116	99	87

AMAZONE spray table for 7-hole nozzle SJ7-04VP (red)

Pressure (bar)	Nozzle output per nozzle (l/min)		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
1.5	1.17	1.04	208	178	156	139	125	113	104	89	78
2.0	1.33	1.18	236	202	177	157	142	129	118	101	89
2.5	1.45	1.28	256	219	192	171	154	140	128	110	96
3.0	1.55	1.37	274	235	206	183	164	149	137	117	103
3.5	1.66	1.47	295	253	221	196	177	161	147	126	110
4.0	1.72	1.52	304	261	228	203	182	166	152	130	114

AMAZONE spray table for 7-hole nozzle SJ7-05VP (brown)

Pressure (bar)	Nozzle output per nozzle (l/min)		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
1.5	1.49	1.32	264	226	198	176	158	144	132	113	99
2.0	1.68	1.49	298	255	224	199	179	163	149	128	112
2.5	1.83	1.62	324	278	243	216	194	177	162	139	122
3.0	1.95	1.73	346	297	260	231	208	189	173	148	130
3.5	2.11	1.87	374	321	281	249	224	204	187	160	140
4.0	2.16	1.91	382	327	287	255	229	208	191	164	143

AMAZONE spray table for 7-hole nozzle SJ7-06VP (grey)

Pressure (bar)	Nozzle output per nozzle (l/min)		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
1.5	1.77	1.57	314	269	236	209	188	171	157	135	118
2.0	2.01	1.78	356	305	267	237	214	194	178	153	134
2.5	2.19	1.94	388	333	291	259	233	212	194	166	146
3.0	2.35	2.08	416	357	312	277	250	227	208	178	156
4.0	2.61	2.31	562	396	347	308	277	252	231	198	173

AMAZONE spray table for 7-hole nozzle SJ7-08VP (white)

Pressure (bar)	Nozzle output per nozzle (l/min)		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
1.5	2.28	2.02	404	346	303	269	242	220	202	173	152
2.0	2.66	2.35	470	403	353	313	282	256	235	201	176
2.5	2.94	2.60	520	446	390	347	312	284	260	223	195
3.0	3.15	2.79	558	478	419	372	335	304	279	239	209
4.0	3.46	3.06	612	525	459	408	367	334	306	262	230

13.2.3 Spray table for FD nozzles

AMAZONE spray table for FD-04 nozzle

Druck (bar)	Düsenausstoß pro Düse (l/min)		Aufwandmenge AHL (l/ha) / km/h								
	Wasser	AHL	6	7	8	9	10	11	12	14	16
1,5	1,13	1,00	200	171	150	133	120	109	100	86	75
2,0	1,31	1,15	230	197	173	153	138	125	115	99	86
2,5	1,46	1,29	258	221	194	172	155	141	129	111	97
3,0	1,60	1,41	282	241	211	188	169	154	141	121	106
4,0	1,85	1,63	326	279	245	217	196	178	163	140	122

AMAZONE spray table for FD-05 nozzle

Druck (bar)	Düsenausstoß pro Düse (l/min)		Aufwandmenge AHL (l/ha) / km/h								
	Wasser	AHL	6	7	8	9	10	11	12	14	16
1,5	1,41	1,24	248	213	186	165	149	135	124	106	93
2,0	1,63	1,44	288	247	216	192	173	157	144	123	108
2,5	1,83	1,61	322	276	242	215	193	176	161	138	121
3,0	2,00	1,76	352	302	264	235	211	192	176	151	132
4,0	2,31	2,03	406	348	305	271	244	221	203	174	152

AMAZONE spray table for FD-06 nozzle

Pressure (bar)	Nozzle output per nozzle (l/min)		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
1.5	1.70	1.49	298	255	224	199	179	163	149	128	112
2.0	1.96	1.72	344	295	258	229	206	188	172	147	129
2.5	2.19	1.93	386	331	290	257	232	211	193	165	145
3.0	2.40	2.11	422	362	317	282	253	230	211	181	158
4.0	2.77	2.44	488	418	366	325	293	266	244	209	183

AMAZONE spray table for FD-08 nozzle

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	2.26	1.99	398	341	299	265	239	217	199	171	149
2.0	2.61	2.30	460	394	345	307	276	251	230	197	173
2.5	2.92	2.57	514	441	386	343	308	280	257	220	193
3.0	3.20	2.82	563	483	422	375	338	307	282	241	211
4.0	3.70	3.25	650	557	488	433	390	355	325	279	244

AMAZONE spray table for FD-10 nozzle

Pressure	Nozzle output per nozzle		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.5	2.83	2.49	498	427	374	332	299	272	249	214	187
2.0	3.27	2.88	576	494	432	384	345	314	288	246	216
2.5	3.65	3.21	642	551	482	429	385	350	321	275	241
3.0	4.00	3.52	704	604	528	469	422	384	352	302	264
4.0	4.62	4.07	813	697	610	542	488	444	407	348	305

13.2.4 Spray table für drag hose unit

AMAZONE spray table for dosing disc 4916-26, (dia. 0.65 mm)

Pressure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.20	0.18	71	61	53	47	43	37	36	31	27
1.2	0.22	0.19	78	67	58	52	47	43	39	34	29
1.5	0.24	0.21	85	73	64	57	51	47	43	37	32
1.8	0.26	0.23	92	79	69	61	55	50	46	40	35
2.0	0.28	0.25	99	85	74	66	60	54	50	43	37
2.2	0.29	0.26	103	88	77	68	62	56	52	44	39
2.5	0.31	0.27	110	94	82	73	66	60	55	47	41
2.8	0.32	0.28	113	97	85	76	68	62	57	49	43
3.0	0.34	0.30	120	103	90	80	72	66	60	52	45
3.5	0.36	0.32	127	109	96	85	77	70	64	55	48
4.0	0.39	0.35	138	118	104	92	83	76	69	59	52

AMAZONE spray table with dosing disc 4916-32, (dia. 0.8 mm)

Pressure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.31	0.27	110	94	82	73	66	60	55	47	41
1.2	0.34	0.30	120	103	90	80	72	66	60	52	45
1.5	0.38	0.34	135	115	101	90	81	74	68	58	51
1.8	0.41	0.36	145	124	109	97	87	79	73	62	55
2.0	0.43	0.38	152	130	114	101	92	83	76	65	57
2.2	0.45	0.40	159	137	119	106	96	87	80	69	60
2.5	0.48	0.42	170	146	127	113	102	93	85	73	64
2.8	0.51	0.45	181	155	135	120	109	98	91	78	68
3.0	0.53	0.47	188	161	141	125	113	103	94	81	71
3.5	0.57	0.50	202	173	151	135	121	110	101	87	76
4.0	0.61	0.54	216	185	162	144	130	118	108	93	81

AMAZONE spray table for dosing disc 4916-39, (dia. 1.0 mm) (standard)

Pressure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.43	0.38	153	131	114	101	92	84	77	66	57
1.2	0.47	0.41	167	143	124	110	100	91	84	72	62
1.5	0.53	0.47	187	160	141	126	112	102	94	80	71
1.8	0.58	0.51	204	175	154	137	122	112	102	88	77
2.0	0.61	0.53	216	185	162	144	130	118	108	93	81
2.2	0.64	0.56	227	194	170	151	136	124	114	97	85
2.5	0.68	0.59	240	206	180	160	142	132	120	103	90
2.8	0.71	0.62	251	215	189	168	151	137	126	108	95
3.0	0.74	0.64	262	224	197	175	158	143	131	112	99
3.5	0.79	0.69	280	236	210	186	168	153	140	118	105
4.0	0.85	0.74	302	259	226	201	181	165	151	130	113

AMAZONE spray table for dosing disc 4916-45, (dia. 1.2 mm)

Pressure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.57	0.50	202	173	151	135	121	110	101	87	76
1.2	0.62	0.55	219	188	165	146	132	120	110	94	83
1.5	0.70	0.62	248	212	186	165	149	135	124	106	93
1.8	0.77	0.68	273	234	204	182	164	148	137	117	102
2.0	0.81	0.72	287	246	215	192	172	157	144	123	108
2.2	0.86	0.76	304	261	228	203	183	166	152	131	114
2.5	0.92	0.81	326	279	244	217	196	178	163	140	122
2.8	0.96	0.85	340	291	255	227	204	186	170	146	128
3.0	1.00	0.89	354	303	266	236	213	193	177	152	133
3.5	1.10	0.97	389	334	292	260	234	213	195	167	146
4.0	1.16	1.03	411	352	308	274	246	224	206	176	154

AMAZONE spray table for dosing disc 4916-55, (dia. 1.4 mm)

Pressure	Nozzle output per dosing disc		AUS spray rate (l/ha) / km/h								
	Water	AUS	6	7	8	9	10	11	12	14	16
(bar)	(l/min)										
1.0	0.86	0.76	304	261	228	203	183	166	152	131	114
1.2	0.93	0.82	329	282	247	219	198	180	165	141	124
1.5	1.05	0.93	372	319	278	248	223	203	186	160	139
1.8	1.15	1.02	407	349	305	271	245	222	204	175	153
2.0	1.22	1.08	432	370	324	288	259	236	216	185	162
2.2	1.27	1.12	450	385	337	300	270	245	225	163	168
2.5	1.35	1.19	478	410	358	319	287	261	239	205	179
2.8	1.43	1.27	506	434	380	337	304	276	253	217	190
3.0	1.47	1.30	520	446	390	347	312	284	260	223	195
3.5	1.59	1.41	563	482	422	375	338	307	282	241	211
4.0	1.69	1.50	598	513	449	399	359	327	299	257	225

13.3 Conversion table for spraying ammonium nitrate / urea solution (AUS) liquid fertiliser

(Density 1.28 kg/l, i.e. approx. 28 kg N for 100 kg of liquid fertiliser or 36 kg N for 100 litres of liquid fertiliser at 5

N kg	Sol. N l	Sol. N kg	N kg	Sol. N l	Sol. N kg	N kg	Sol. N l	Sol. N kg	N kg	Sol. N l	Sol. N kg
10	27.8	35.8	52	144.6	186.0	94	261.2	335.8	136	378.0	485.0
12	33.3	42.9	54	150.0	193.0	96	266.7	342.7	138	384.0	493.0
14	38.9	50.0	56	155.7	200.0	98	272.0	350.0	140	389.0	500.0
16	44.5	57.1	58	161.1	207.3	100	278.0	357.4	142	394.0	507.0
18	50.0	64.3	60	166.7	214.2	102	283.7	364.2	144	400.0	515.0
20	55.5	71.5	62	172.3	221.7	104	285.5	371.8	146	406.0	521.0
22	61.6	78.5	64	177.9	228.3	106	294.2	378.3	148	411.0	529.0
24	66.7	85.6	66	183.4	235.9	108	300.0	386.0	150	417.0	535.0
26	75.0	92.9	68	188.9	243.0	110	305.6	393.0	155	431.0	554.0
28	77.8	100.0	70	194.5	250.0	112	311.1	400.0	160	445.0	572.0
30	83.4	107.1	72	200.0	257.2	114	316.5	407.5	165	458.0	589.0
32	89.0	114.2	74	204.9	264.2	116	322.1	414.3	170	472.0	607.0
34	94.5	121.4	76	211.6	271.8	118	328.0	421.0	175	486.0	625.0
36	100.0	128.7	78	216.5	278.3	120	333.0	428.0	180	500.0	643.0
38	105.6	135.9	80	222.1	285.8	122	339.0	436.0	185	514.0	660.0
40	111.0	143.0	82	227.9	292.8	124	344.0	443.0	190	527.0	679.0
42	116.8	150.0	84	233.3	300.0	126	350.0	450.0	195	541.0	696.0
44	122.2	157.1	86	238.6	307.5	128	356.0	457.0	200	556.0	714.0
46	127.9	164.3	88	242.2	314.1	130	361.0	465.0			
48	133.3	171.5	90	250.0	321.7	132	367.0	471.0			
50	139.0	178.6	92	255.7	328.3	134	372.0	478.0			

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